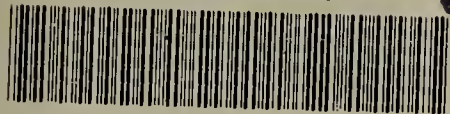


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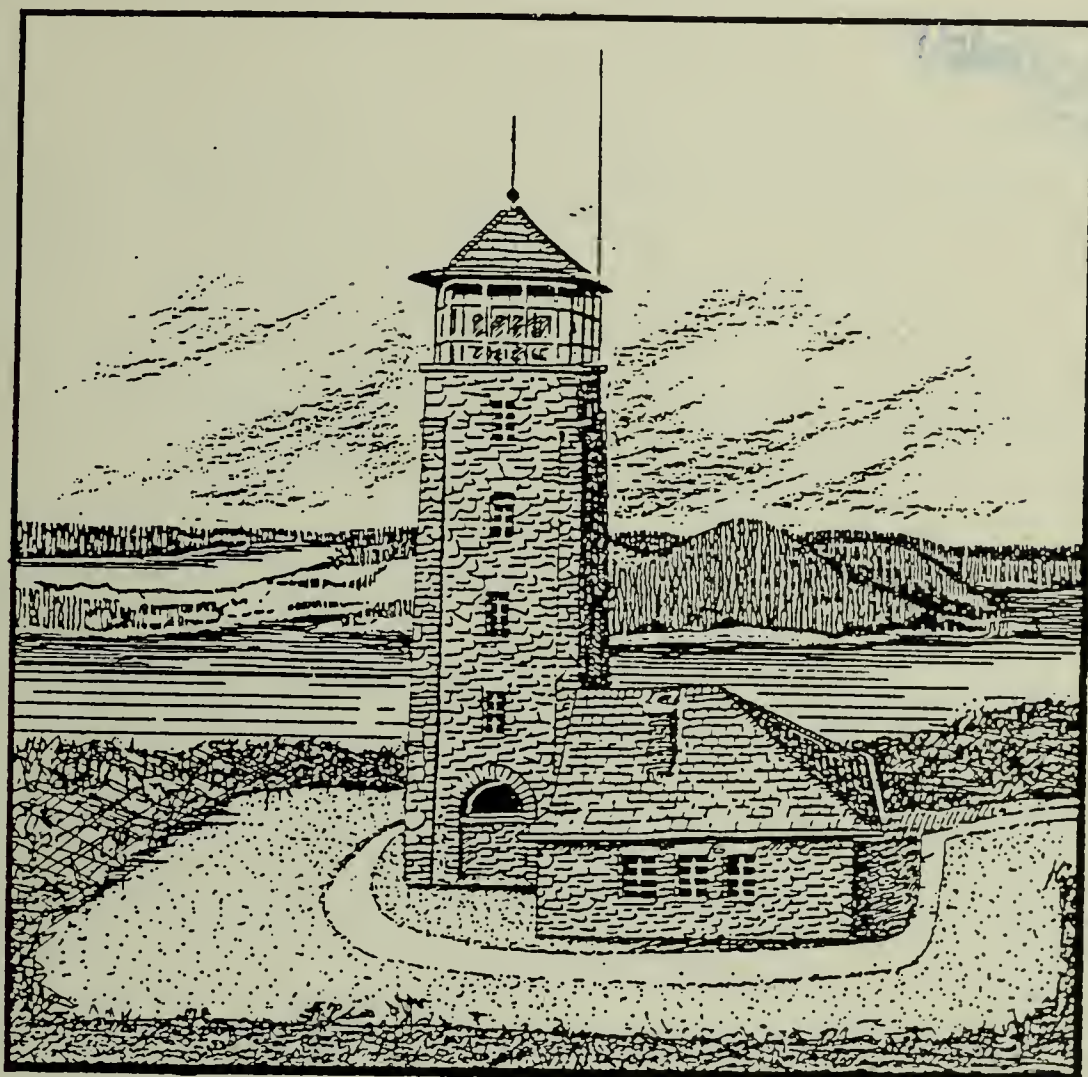


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JABBIN RESERVOIR

WATER QUALITY AND SEDIMENT DATA REPORT

1989



EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS

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QUABBIN RESERVOIR WATER QUALITY AND SEDIMENT DATA REPORT

1989

Prepared By

DEPARTMENT OF ENVIRONMENTAL PROTECTION

DIVISION OF WATER POLLUTION CONTROL

TECHNICAL SERVICES BRANCH

WESTBOROUGH

AND

METROPOLITAN DISTRICT COMMISSION

DIVISION OF WATERSHED MANAGEMENT

ENVIRONMENTAL QUALITY SECTION

BOSTON

JULY 1990

COMMONWEALTH OF MASSACHUSETTS

EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS

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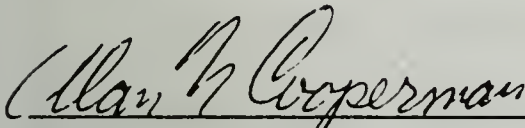
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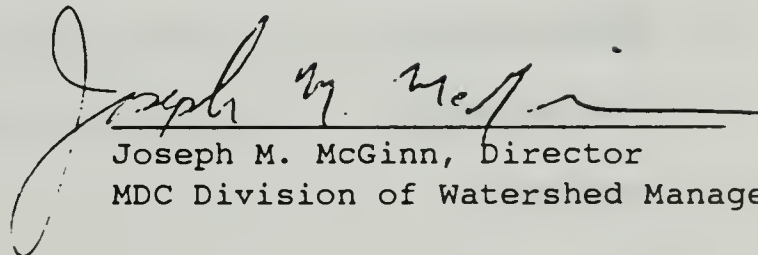
TITLE: Quabbin Reservoir Water Quality and Sediment Data Report

DATE: 7-30-90

PREPARED BY: Elaine M. Hartman, DEP/Westborough
Patricia E. Austin, MDC/Boston
Kathleen M. Keohane, DEP/Westborough
David Chandler, MDC/Quabbin

REVIEWED BY:


Alan N. Cooperman, Supervisor
DWPC Technical Services Branch


Joseph M. McGinn, Director
MDC Division of Watershed Management

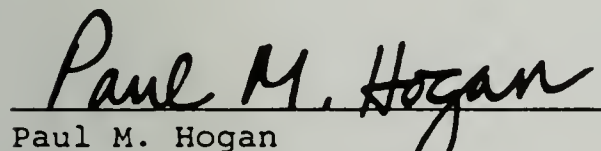

Paul M. Hogan
Basin Planning Manager
DWPC Technical Services Branch

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FOREWORD

MASSACHUSETTS DIVISION OF WATER POLLUTION CONTROL (MDWPC)

The Massachusetts Division of Water Pollution Control was established by the Massachusetts Clean Water Act, Chapter 21 of the General Laws as amended by Chapter 685 of the Acts of 1966. Included in the duties and responsibilities of the Division is the periodic examination of the water quality of various coastal waters, rivers, streams and ponds of the Commonwealth, as stated in section 27, paragraph 5 of the Acts. This section further directs the Division to publish the results of such examination together with the standards of water quality established for the various waters. The Technical Services Branch of the Division of Water Pollution Control has, among its responsibilities, the execution of this directive. This report is published under the Authority of the Acts and is among a continuing series of reports issued by the Division presenting water quality data and analyses, water quality management plans, baseline and intensive limnological studies, and various special studies.

METROPOLITAN DISTRICT COMMISSION (MDC)

The Metropolitan District Commission's Division of Watershed Management (DWM) was established by the Massachusetts Legislature in 1984 and officially began operations on July 1, 1985. The legislative mission of the organization is to "...construct, maintain and operate a system of watersheds, reservoirs, water rights and rights in sources of supply in order to provide a sufficient supply of pure water to the Massachusetts Water Resources Authority." The Division must conserve and protect these resources in order to ensure the purity of the drinking water supply.

As provided in the enabling legislation, the Division of Watershed Management is responsible for monitoring the streams and reservoirs of the system and for conducting sanitary surveys of the watersheds. The DWM's Environmental Quality Section performs these tasks in order to ensure that Class A Water Quality Standards are met. MDC-DWM has responsibility for monitoring upstream of the distribution intakes, considered to be the Cosgrove Aqueduct at Wachusett Reservoir, the Winsor Dam at Quabbin Reservoir, and Shaft 4 at Sudbury Reservoir. The Massachusetts Water Resources Authority is responsible for monitoring the distribution system.

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INTRODUCTION

In 1989, the Massachusetts Division of Water Pollution Control and the Metropolitan District Commission - Division of Watershed Management initiated a cooperative and comprehensive study of the Quabbin Reservoir watershed system. This water supply was identified in the Massachusetts Nonpoint Source Management Plan (1989) as an area of primary concern for protection in the state. The State Water Resource Protection Strategy Report (1990) identified water supplies in general as areas of primary concern for protection. The Nonpoint Source Management Plan states that, "The DWPC will work with the Environmental Quality Section of the MDC-DWM to produce a viable and meaningful watershed protection plan (for Quabbin Reservoir). The DWPC will be able to lend water quality monitoring and assessment support as part of the plan."

Review by these agencies of the historical data on Quabbin and of the recommendations from earlier studies indicated that although a substantial data base exists for some parameters, several significant data gaps still remain. These included:

1. Reservoir data for most parameters for depths other than the surface.
2. Tributary information for metals and nutrients.
3. Tributary flow data.

The Quabbin project was designed to fill these gaps. The resulting information is being evaluated to assess the current trophic status, and to formulate nonpoint source control and other water quality protection strategies to produce a watershed management plan for the Quabbin system. The data and analyses will appear in a series of reports designed to provide timely release of the extensive information produced as part of this project. This report is the first in the series and is a compilation of the data from the in-reservoir portion of the project. The second publication will report the data from the tributary and outlet sampling. Subsequent reports will focus on the water quality analyses and recommendations for preservation/management of the system. The field and laboratory data will also be available on disk in a series of LOTUS files.

Field work for the project began in April 1989 and extended until November 1989 for the in-reservoir section of the project, and until April 1990 for the tributaries. Eight reservoir stations representing all areas of the reservoir were sampled from April through November 1989, once per month, or as weather permitted. In November, only two stations, Winsor Dam and the outlet to the Wachusett Reservoir, were sampled. An investigative sediment sampling program was also conducted at eleven stations in the reservoir. All major tributaries were sampled over the twelve month period. Nineteen tributary stations representing thirteen tributaries, plus the two outlets which discharge from the reservoir (Winsor Dam and Shaft 12 to Wachusett) were sampled twice per month for one year. The tributary stations were sited as close to the discharge point into the reservoir as possible in order that chemical and flow figures would represent total loadings from each of the tributary sub-drainage areas. In addition, six of the tributaries were also sampled at one upstream station each

for comparison with downstream water quality data. The water diverted from the Ware River basin was also sampled, if the diversion was operating on the sampling date.

During the course of the field sampling, preliminary data on the reservoir indicated that a closer examination should be given to conditions in the eastern arm of the reservoir. Due to the significant volume of water diverted from the Ware River, and since little historical nutrient, suspended solids or metal data existed for this system in the area upstream of the diversion intake in Barre, two sampling rounds were conducted in the Ware River watershed. The sampling was performed in order that preliminary information could be collected to determine if any of the Ware River sub-watersheds were contributing to the conditions in this portion of Quabbin. Sediment samples were also collected from the eastern arm to evaluate this avenue as a possible source.

METHODS

In order to characterize the reservoir, ten sampling stations were originally selected by the MDWPC and the MDC from a review of the topographic maps of the area and from an analysis of the studies performed earlier on this extensive waterbody. The stations identified for sampling were distributed throughout all areas of the reservoir as described in Table 1 and Figures 1 through 5. After the first sampling round was completed, the number of stations was reduced to eight due to equipment and time constraints. The plan involved sampling all stations on the same day using two boat crews composed of representatives from both organizations using identical field equipment. Samples were collected once per month from April through November. In November, samples were collected at only two stations, Winsor Dam and the outlet to the Wachusett Reservoir, due to adverse weather conditions.

The in-lake stations were sampled 0.5 m from the surface and one meter from the bottom during times of mixis and at the top and bottom of the epilimnion and hypolimnion during stratification. Samples were collected at these depths for total phosphorus, the nitrogen series, hardness, total and fixed solids, chloride, alkalinity, color and turbidity. Separate bacterial samples were taken from the surface for total coliform and total heterotrophic bacteria. Metal samples were collected from one meter above the sediment and analyzed for the following metals: aluminum, arsenic, cadmium, calcium, chromium, copper, iron, lead, mercury, nickel, silver, and zinc. Duplicate metal and nutrient samples were collected at one station by each crew on each sample date, together with equipment and distilled water blanks.

Vertical profiles were recorded on-site for pH, temperature, conductivity and dissolved oxygen using a digital 4041 Model Hydrolab, the Surveyor II. During mixed conditions, readings were taken at every 3 to 5 meters, while during stratification, readings were taken in the more changeable epilimnion and metalimnion at every meter, and in the hypolimnion at every meter until consistent readings were recorded in that strata and the determination was made that the hypolimnion could be characterized. From that point to the bottom, readings were taken at every 3 to 5 meters (depending on depth extent of layer), for the deep stations, and every one meter of depth at the shallower stations. This program was modified as time and weather conditions necessitated. Secchi

disc readings were noted at each station.

Composite algal samples were collected, at most stations, at depths of 0.5 meters, three times the Secchi disc and halfway in between. At station QR06 (the Shaft 12 aqueduct to Wachusett), algal samples were collected from depths selected to coincide with studies at the Wachusett Reservoir. Discrete algal samples were collected at this station in lieu of composite, and were also collected at some stations at which a dissolved oxygen maxima was noted. Appendix E details specific depths at which samples were collected at all stations for all depths and dates.

The nutrient and hardness samples were preserved using 2 ml of a 1:1 solution of sulfuric acid. Metal samples were preserved using 2 ml of a 1:1 solution of nitric acid. All samples were stored in iced coolers for transport to the laboratories at which they would be analyzed. A listing of the laboratories performing each analysis together with the laboratory methods used are listed in Appendices A and B. Appendix C describes sample container preparation.

Sediment testing was conducted in October 1989 at eleven stations selected by MDWPC-TSB and MDC-DWM after a review of the chemical and physical data collected during this and earlier studies, in conjunction with a review of the sediment sampling plan previously proposed by a consultant to MDC-DWM (Metcalf and Eddy, 1987). Five sediment sampling stations (QS-D, QS-E, QS-H, QS-I and QS-J) were selected to coincide with water quality sampling stations (QR01, QR04, QR06, QR07 and QR10). Three stations (QS-B, QS-G and QS-H) were selected to sample submersed ponds (Ash Pond, Greenwich Lake, and Quabbin Lake). Two stations were selected to provide background conditions (Prescott Brook and Cadwell Creek), and two stations were chosen to evaluate conditions in the eastern section of the reservoir (QS-K for the boat mooring area, and QS-J for the eastern shallows). The shallow areas in the western arm of the reservoir and the discharge of waters from the West Branch of the Swift River were sampled at station QS-A.

Sediments were collected using a one square meter Ponar sampler mounted to a winch on the side of the boat. The samples were collected in specially cleaned containers and were analyzed for the chemicals and nutrients listed in 314 CMR 9.00. Duplicate samples were taken at most sites. Four samples were collected in the eastern section of the reservoir at the location in which the Ware River is diverted into Quabbin. The stations sampled are listed in Table 1 and appear on the map in Figure 6.

TABLE 1

QUABBIN RESERVOIR WATER QUALITY AND SEDIMENT DATA REPORT

RESERVOIR SAMPLING STATIONS

WATER COLUMN

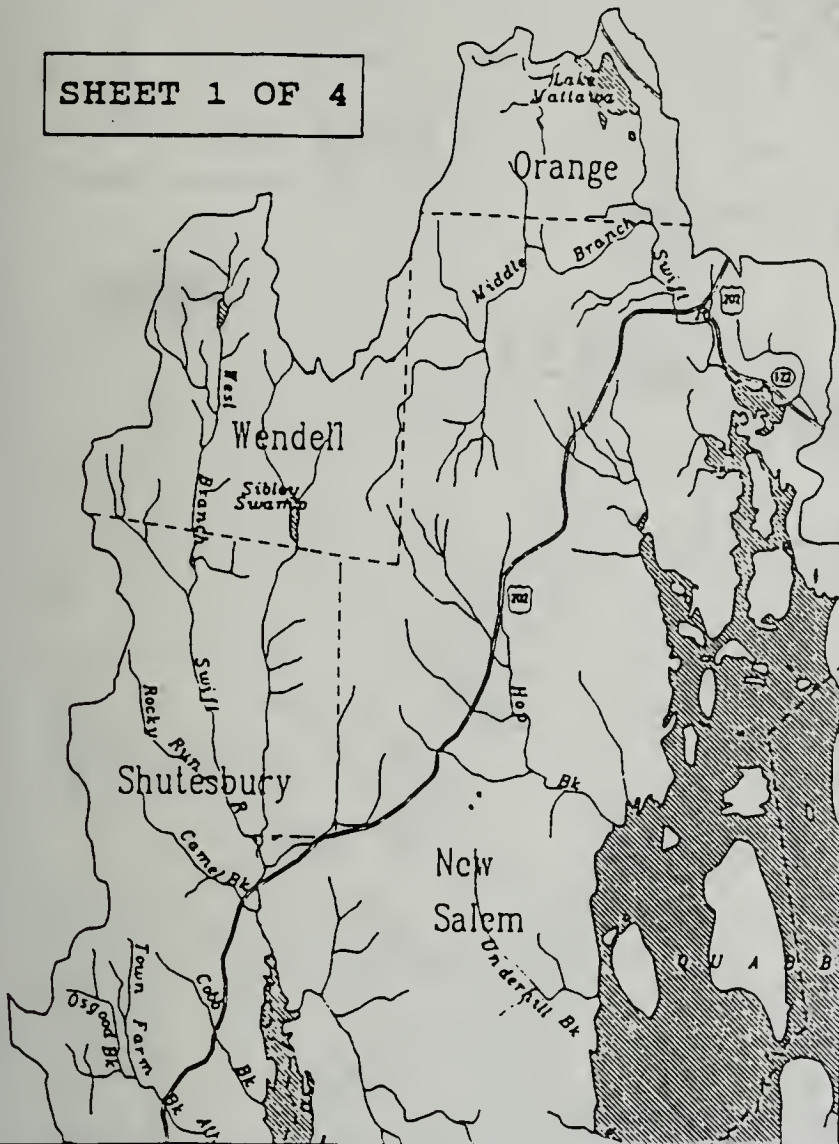
<u>Location</u>	<u>DEP Station No.</u>	<u>MDC Station No.</u>
West Arm (WA) Winsor Dam	QR01	202
(WA) Above Cadwell Creek	QR02	203
(WA) Above Atherton Brook	QR03	203A
Enfield	QR04	210
Central Basin (CB)	QR05	--
(CB) Quabbin Lake	QR06	206
(CB) West of Mount Zion	QR07	207
East Arm (EA) East of Mount L	QR08	208A
(EA) East of Mount Zion	QR09	208
(EA) Off Den Hill	QR10	--

SEDIMENTS

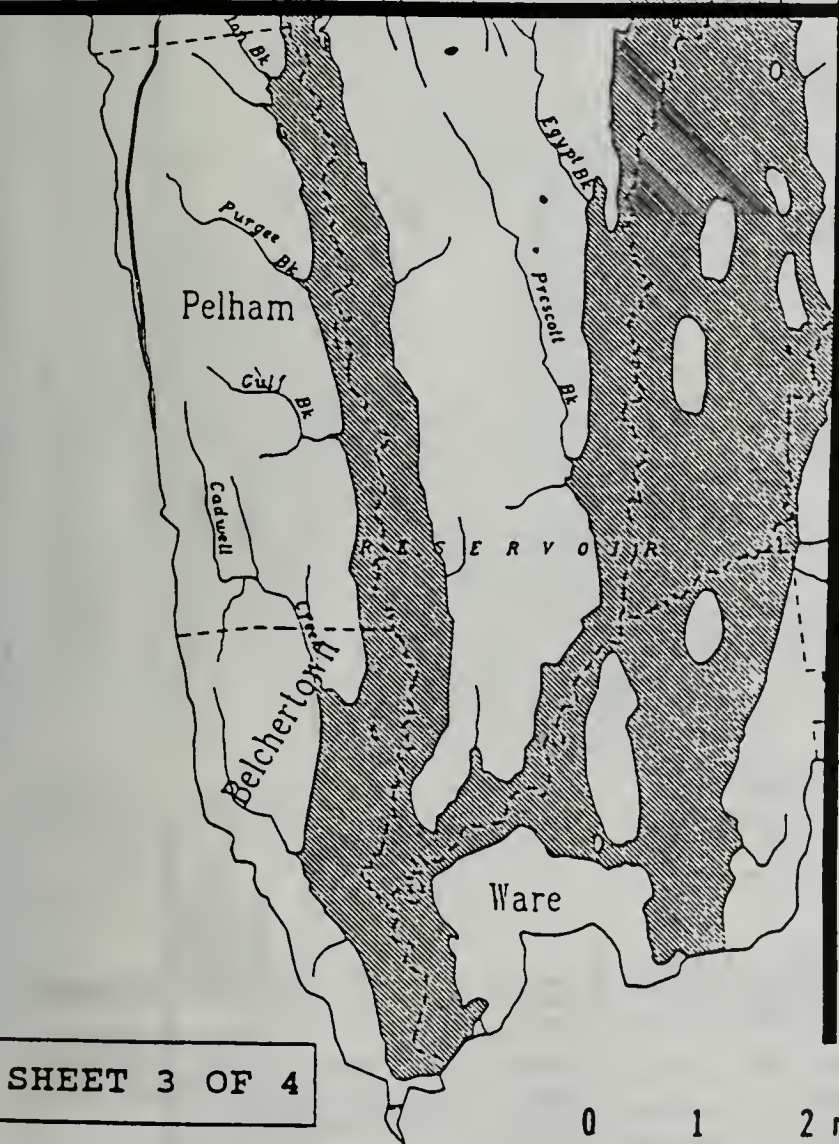
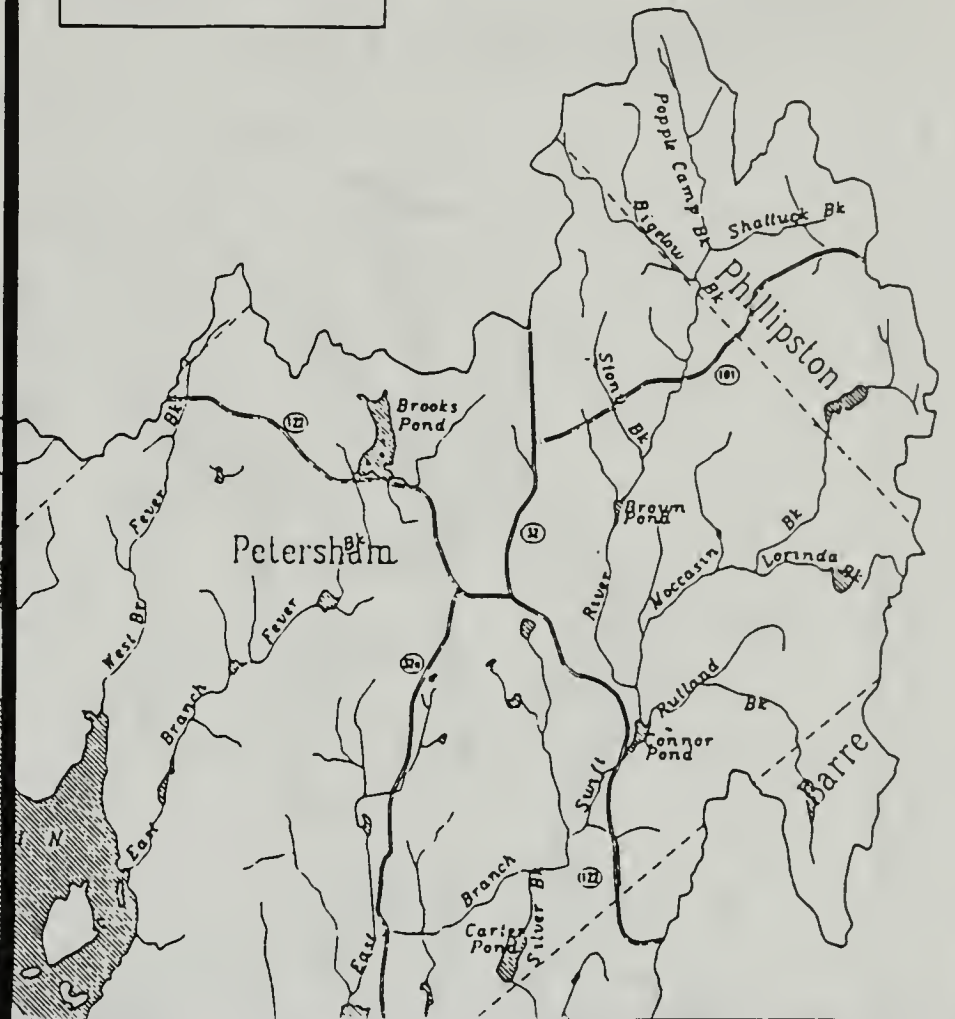
<u>Location</u>	<u>DEP Station No.</u>
West Branch Swift River	QS-A
Ash Pond	QS-B
Cadwell Creek	QS-C
Winsor Dam	QS-D/QR01
Enfield	QS-E/QR04
Prescott Brook	QS-F
Greenwich Lake	QS-G
Shaft 12/Quabbin Lake	QS-H/QR06
Mid-Basin (CB)	QS-I/QR07
East Arm	QS-J/QR10
Boat Rental Area (EA)	QS-K

FIGURE 1: QUABBIN RESERVOIR LOCATOR MAP INDEX

SHEET 1 OF 4

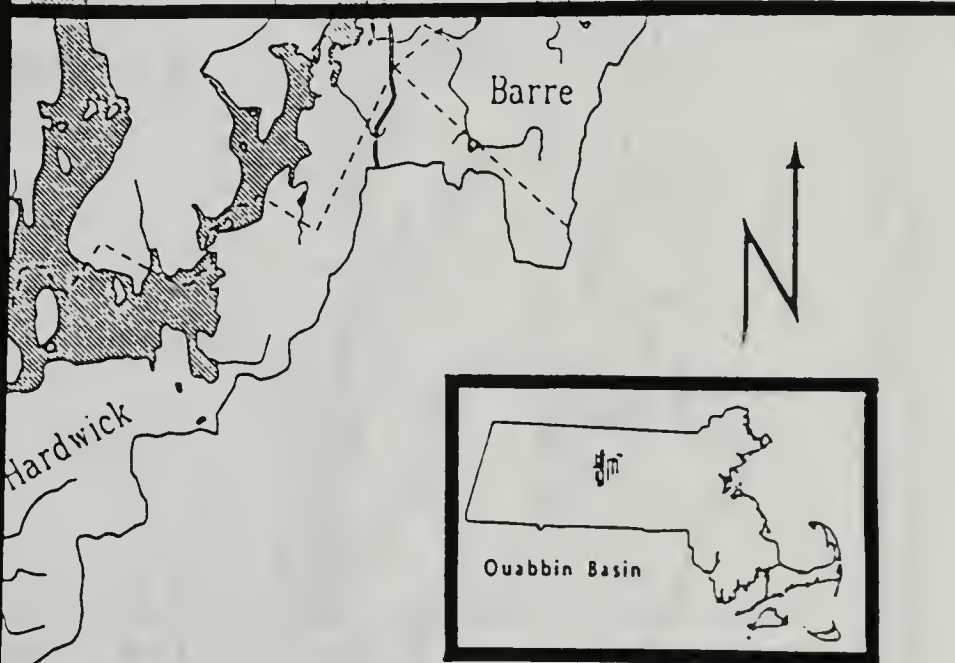


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SHEET 3 OF 4

SHEET 4 OF 4

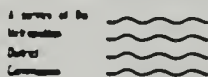


LEGEND

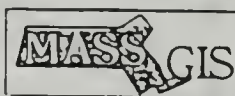
- Watershed Divide
- Town Boundary

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PureWater

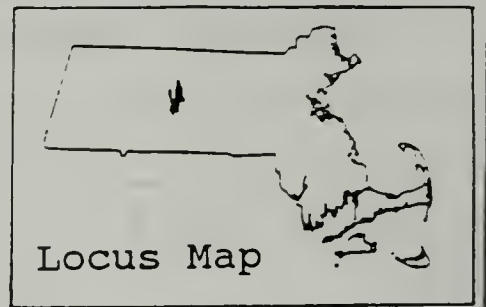


D. O'CARA & C. HAZELTON 7/3/98



Massachusetts Department of Environmental Affairs - 010

FIGURE 2: QUABBIN RESERVOIR
NORTHWEST SAMPLING STATIONS



LEGEND

- ☒ Weather Station
- ▲ Reservoir Sampling Station

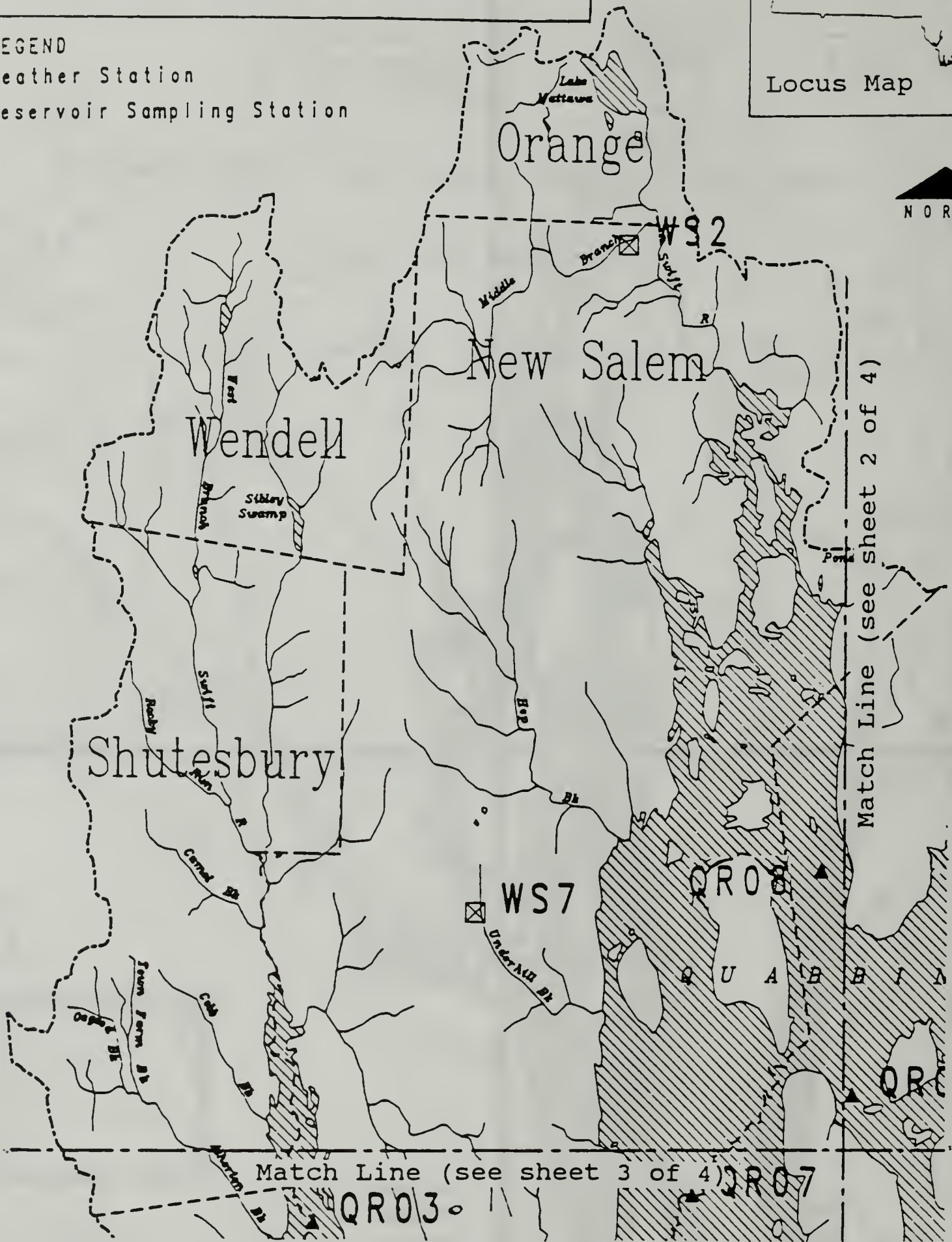
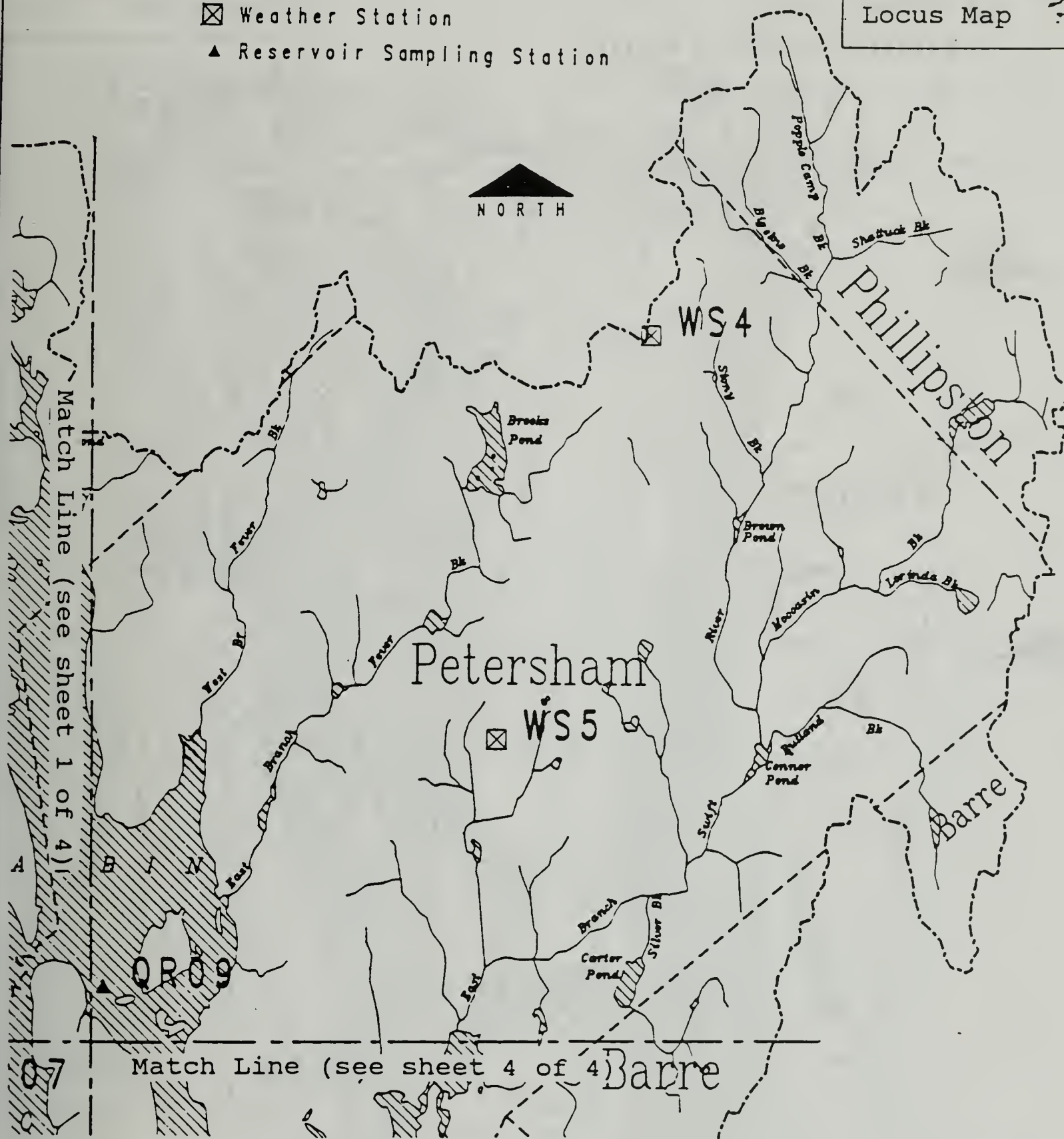


FIGURE 3: QUABBIN RESERVOIR NORTHEAST SAMPLING STATIONS

- LEGEND**
- ☒ Weather Station
 - ▲ Reservoir Sampling Station

Locus Map

NORTH



SHEET 2 OF 4

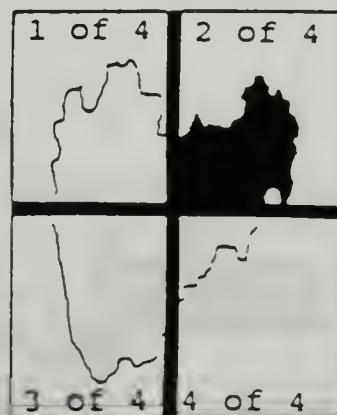
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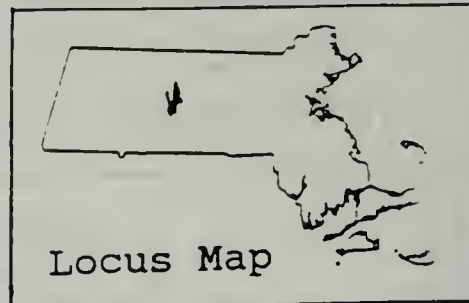
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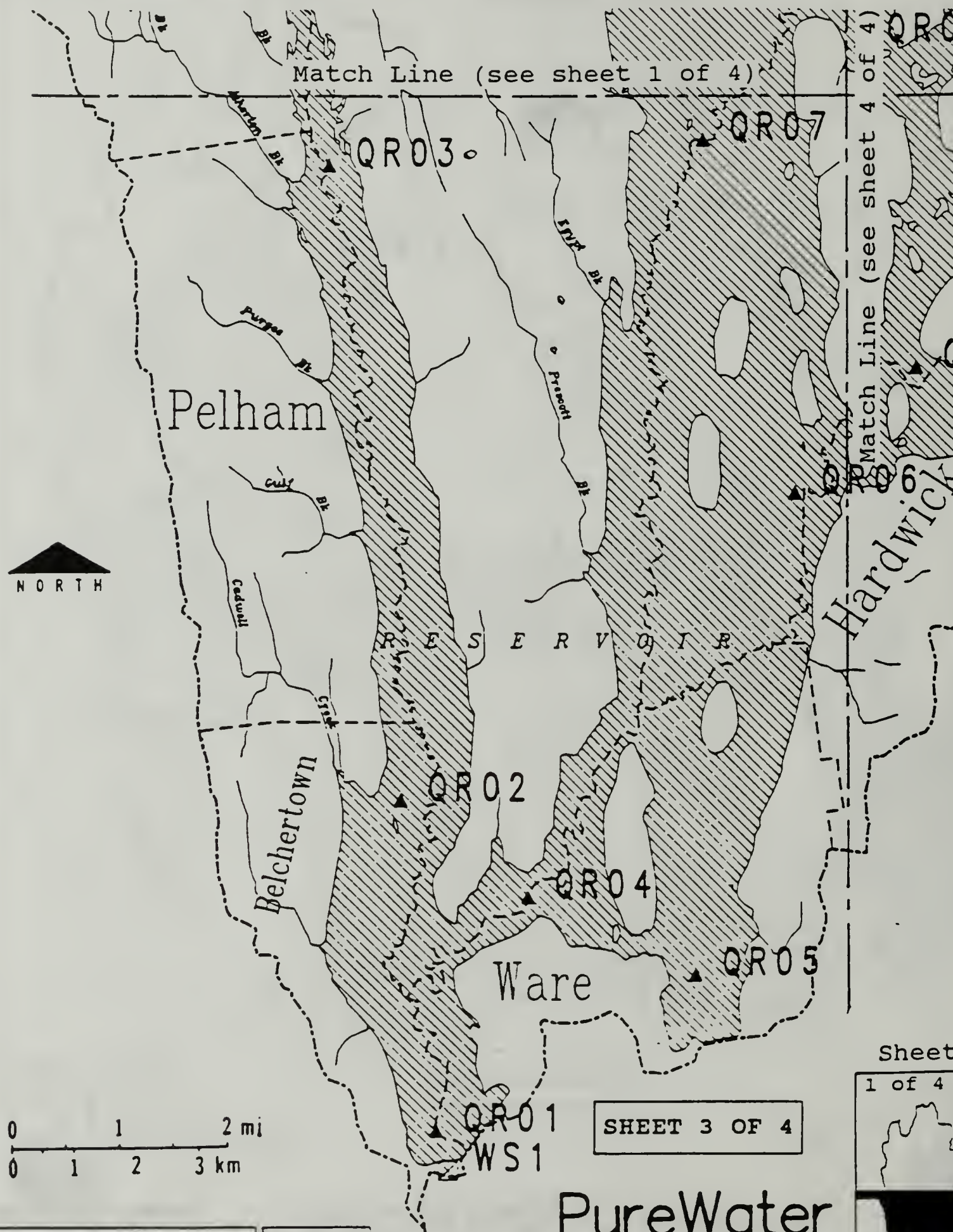
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FIGURE 4: QUABBIN RESERVOIR
SOUTHWEST SAMPLING STATIONS

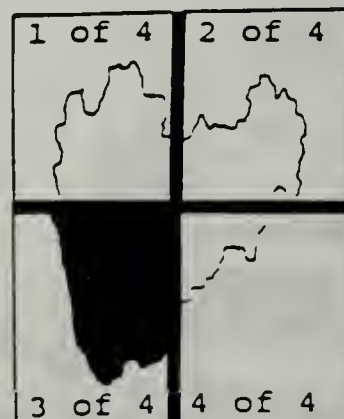


- LEGEND
- ☒ Weather Station
 - ▲ Reservoir Sampling Station



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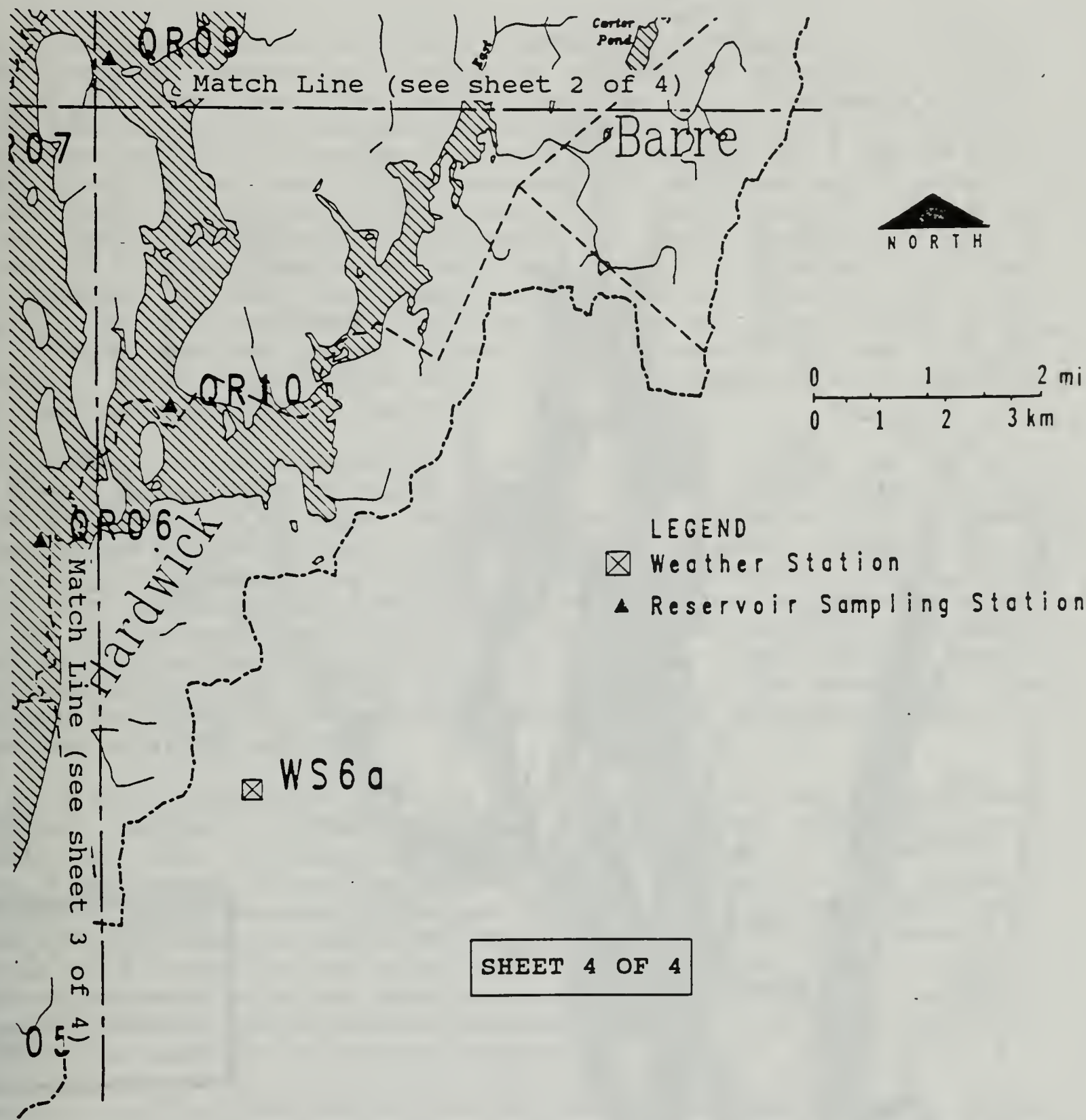
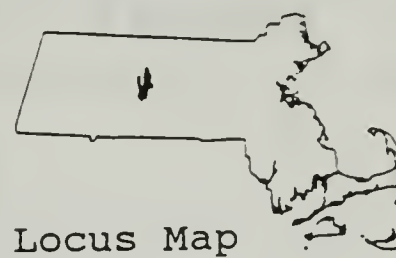
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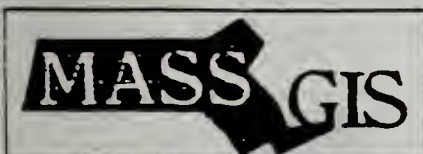
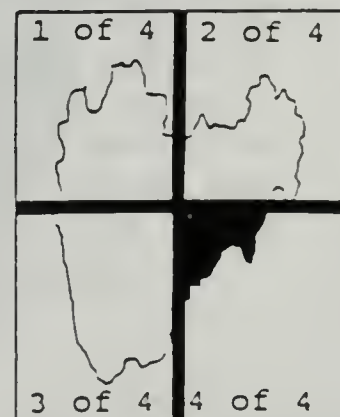


FIGURE 5: QUABBIN RESERVOIR
SOUTHEAST SAMPLING STATIONS



SHEET 4 OF 4

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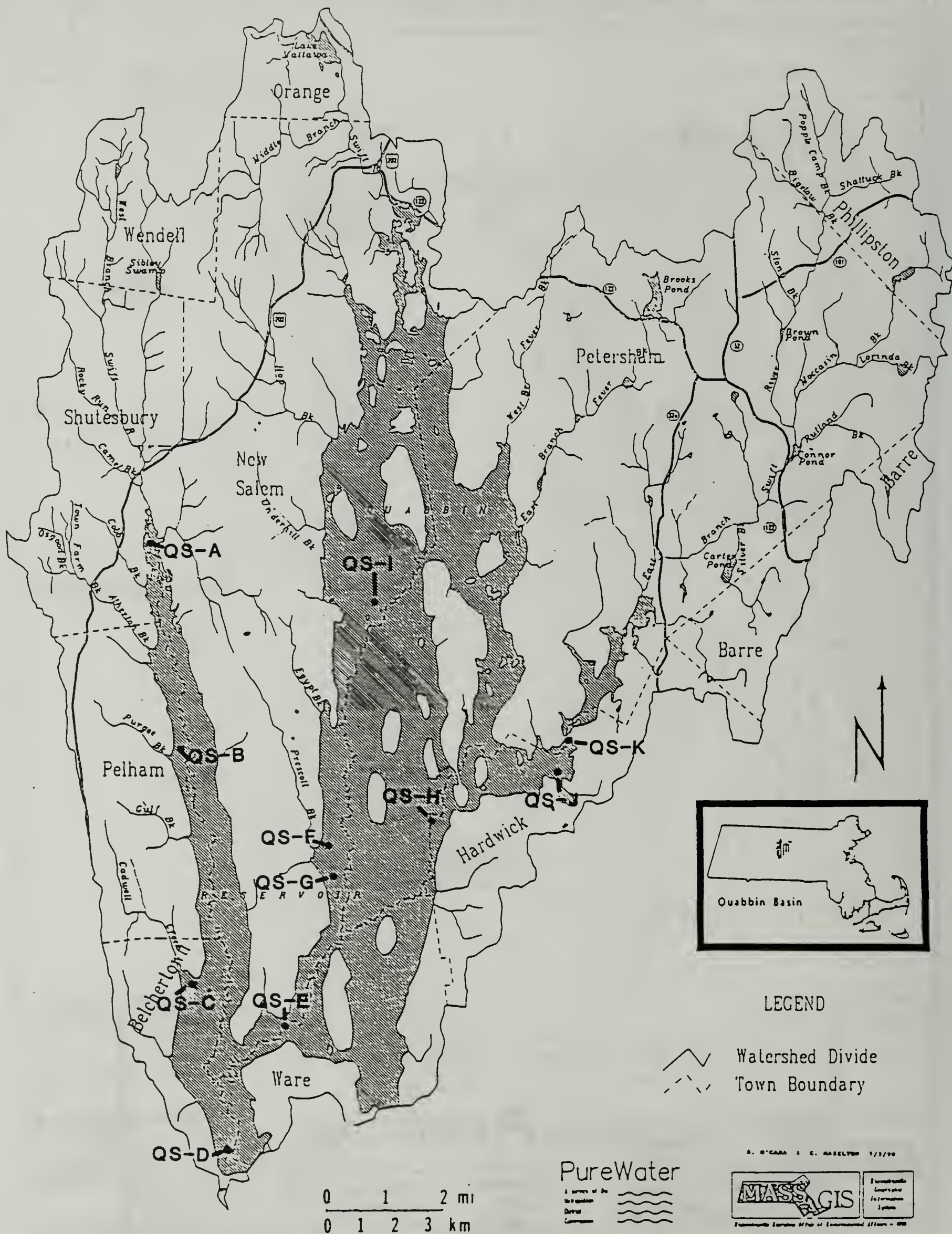
Massachusetts Executive Office of Environmental Affairs - 1996

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FIGURE 6: QUABBIN RESERVOIR
SEDIMENT SAMPLING STATIONS



DESCRIPTION OF THE QUABBIN RESERVOIR BASIN

Quabbin Reservoir, located approximately 65 miles west of Boston in the Chicopee River Basin, was constructed in order to increase the water supply for the Metropolitan Boston area. The reservoir was created by impounding the waters of the East, Middle, and West Branches of the Swift River, and diverting water from 98 square miles of the Ware River basin into the reservoir. The two major retaining structures, Winsor Dam and Goodnough Dike were completed in 1939. At capacity (530 foot elevation-above Boston City Base), the reservoir has a surface area of 23,552 acres (36.8 square miles) with a volume of 412 billion gallons and a maximum depth of 150 feet. The reservoir is situated in the towns of Belchertown, Hardwick, New Salem, Pelham, Petersham, Shutesbury and Ware, with a length of 18 miles and a shoreline of 118 miles. Quabbin Reservoir is part of the MDC water supply system, which together with the Wachusett Reservoir, provides drinking water for 2.5 million people in 46 communities; this is approximately 40% of the state's population.

The drainage area to the reservoir (including the sixty islands and excluding the Ware River watershed) is 96,384 acres (150.6 square miles). Total land and water encompasses 119,936 acres (180.4 square miles). The Division of Watershed Management of the Metropolitan District Commission owns and manages 56,000 of these acres, providing control over 47% of the Quabbin watershed. A significant amount of the remaining watershed has some protection from development. Except for the two southern towns, Belchertown and Ware, the watershed is sparsely populated and has seen little growth in the last fifty years. Although much of the watershed is rough, rocky, wet, and not suitable for development, the potential for growth in the remaining areas could have significant impacts on water quality in the reservoir.

The MDC also has legislative authority for limited diversion from the Ware River watershed, located in the towns of Templeton, Hubbardston, Princeton, Barre, Rutland, and Ware. Diversion is possible between October 15 and June 15, if river flows exceed 85 million gallons per day. Exemption for increased withdrawals may be obtained if the need arises, as during drought conditions. Water from the Ware River enters the aqueduct in Barre and travels westward to Quabbin to discharge in the eastern arm, northeast of Shaft 12 (the outlet aqueduct for water being sent from Quabbin Reservoir to Wachusett Reservoir). A series of baffle dams in Quabbin extends the residence time of the Ware River water in the reservoir and prevents direct entry into Shaft 12.

Quabbin's wildlife community is abundant and varied, due primarily to the diversity of the forested habitats and the protection afforded in the area. The watershed has become a very unique forest and wildlife resource containing several rare, endangered or unique species. The reservation also not only serves as a "wildlife reservoir" to surrounding towns and supplements native populations in these areas, but is a widely used fishing resource. A series of management plans, developed by the MDC, manage the Quabbin Reservation for forestry, wildlife, and recreational values in conjunction with the water quality and water quantity aspects.

Topography

The topographic map of Massachusetts shows the Swift River Valley to be the largest north-south valley between the Connecticut River and the Atlantic Ocean. However, the Swift River drains only a portion of this great valley with the Millers River capturing the northern drainages which are sent westward to discharge into the Connecticut River. The Swift River Valley may have originally been carved by a much larger river.

The three principle tributaries of the Swift River enter Quabbin from the north and the northeast (Figure 1). The Middle Branch drains most of New Salem and has a small but steady flow due to the deep soils found in the northwest part of New Salem. The West Branch drains the Wendell and Shutesbury uplands and contains three valleys that merge just north of the reservoir. The West Branch has a larger drainage than the Middle Branch, but due to the shallow soils has smaller summer flows. The East Branch drains the largest area and originates in the uplands of Petersham and Phillipston. This drainage has a mixture of deep and shallow soils which maintains the largest year round flows of the three branches.

The uplands bordering the Quabbin Reservoir rise five hundred feet above the reservoir to an elevation of one thousand feet above mean sea level. The Prescott Peninsula and western uplands rise very steeply, whereas the eastern uplands rise more gradually.

An aerial view of the Quabbin topography appears smooth with an even surface of tree cover. The land has many small variations in the topography which the forest hides. Terraces, swamps, outcrops, small hills and valleys and other minor variations, some too small to be recorded on topographic maps, make the topography very irregular. The combination of this irregular topography and soils that vary in depth, drainage and fertility have resulted in a diverse forest and landscape.

Soils

The soils of the Quabbin watershed are primarily the glacial tills and alluvial sands and gravels. The till soils cover the uplands in varying depths from one to twenty feet or more. They are comprised of varying amounts of silt, sand, organic matter and rock. These components vary tremendously to produce both fine sandy loams and extremely rocky fine sandy loams. Some of the soils possess a hard mixture of clay and till at two feet to five feet beneath the surface which prevents the penetration of both roots and water. The deep alluvial soils are located in terraces along the sides of valleys and deposits in the valley bottoms. Their depths vary from a few feet to more than 100 feet. They are generally stratified with only an occasional large rock or outcrop.

WATER QUALITY AND SEDIMENT DATA

TABLE 2

QUABBIN RESERVOIR WATER QUALITY AND SEDIMENT DATA REPORT

CHEMICAL AND NUTRIENT DATA (mg/l)

APRIL 19, 1989

STATION QR01

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard (SU)	pH	Dissolved Oxygen (mg/l)	Temp (°C)	Solids		Nitrogen		TP
										Total	Fixed	TKN	NH ₃ NO ₃	
0.5	0.4	15	41	6.5	3.7	12	7.2	12.3	99	6.7	31	22	0.08 <0.02 0.02	0.005
5		41					7.3	12.4	100	6.2				
10		40					7.3	12.5	100	5.8				
15		40					7.3	12.5	99	5.4				
20		40					7.3	12.5	98	5.1				
25		40					7.3	12.5	98	4.8				
30		40					7.3	12.5	97	4.7				
35	0.3	5	40	6.0	3.6	9	7.3	12.4	96	4.7	30	20	0.08 <0.02 0.02	0.004

STATION QR02

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard (SU)	pH	Dissolved Oxygen (mg/l)	Temp (°C)	Solids		Nitrogen		TP
										Total	Fixed	TKN	NH ₃ NO ₃	
0.5	0.3	5	40	6.0	9.0	9	7.2	12.2	99	6.5	31	20	<0.03 <0.02 <0.02	0.002
5		40					7.2	12.3	99	6.2				
10		40					7.2	12.4	100	6.0				
15		40					7.2	12.4	98	5.4				
20		40					7.3	12.4	97	5.1				
25		40					7.3	12.4	97	5.0				
30	0.3	5	40	6.0	8.0	9	7.2	12.4	97	4.9	31	21	0.06 <0.02 0.02	0.003

Note: Conductivity in $\mu\text{mhos/cm}$.

TABLE 2 (CONTINUED)

APRIL 19, 1989

STATION QR03

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard	pH	Dissolved		Temp (°C)	Solids		Nitrogen			TP
								Oxygen (mg/l)	(%Sat)		Total	Fixed	TKN	NH ₃	NO ₃	
0.5	0.3	5	41	6.5	3.0	8	7.1	12.0	99	6.8	30	19	<0.03	<0.02	0.02	0.002
5			41				7.1	12.2	99	6.3						
10			41				7.1	12.1	97	5.8						
15			41				7.1	12.1	96	5.7						
19	0.3	5	41	6.0	3.1	8	7.1	12.1	96	5.7	25	15	0.04	<0.02	0.02	0.005

STATION QR04

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard	pH	Dissolved		Temp (°C)	Solids		Nitrogen			TP
								Oxygen (mg/l)	(%Sat)		Total	Fixed	TKN	NH ₃	NO ₃	
0.5	0.4	5	41	5.5	3.6	9	7.0	12.2	99	6.5	29	19	0.09	<0.02	<0.02	0.004
5			41				7.1	12.2	97	5.5						
10			40				7.1	12.3	97	5.3						
15			40				7.1	12.2	95	5.1						
20			39				7.1	12.3	96	5.0						
25			40				7.1	12.3	96	4.9						
29	0.3	5	40	5.0	3.6	9	7.1	12.3	95	4.7	27	19	0.11	<0.02	0.03	0.004

Note: Conductivity in $\mu\text{mhos/cm}$.

TABLE 2 (CONTINUED)

APRIL 19, 1989

STATION QR05

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard	pH	Dissolved		Temp (°C)	Solids			Nitrogen		TP
								Oxygen (mg/l)	(%Sat)		Total	Fixed	TKN	NH ₃	NO ₃	
0.5	0.3	5	41	6.5	3.7	9	7.0	12.1	100	7.2	30	17	0.07	<0.02	0.03	0.005
5		40					7.0	12.1	98	6.4						
10		40					7.0	12.2	98	6.1						
15		40					7.1	12.3	97	5.4						
20		40					7.0	12.3	97	5.3						
25		40					7.0	12.3	96	5.2						
30		40					7.0	12.3	96	5.2						
34	0.3	5	39	6.0	3.8	11	7.0	12.3	96	5.1	29	16	0.15	<0.02	0.03	0.005

STATION QR06

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard	pH	Dissolved		Temp (°C)	Solids			Nitrogen		TP
								Oxygen (mg/l)	(%Sat)		Total	Fixed	TKN	NH ₃	NO ₃	
0.5	0.3	5	42	6.0	3.8	13	7.1	11.7	96	7.1	23	11	<0.03	<0.02	0.02	0.002
5		42					7.2	12.2	99	6.7						
10		42					7.2	12.0	96	5.8						
15		42					7.2	11.9	94	5.7						
20		40					7.2	11.8	93	5.5						
25		40					7.2	11.7	93	5.5						
30		40					7.2	11.7	93	5.4						
32	0.4	5	42	5.5	3.8	9	7.2	11.7	93	5.4	28	15	<0.03	<0.02	<0.02	0.003

Note: Conductivity in $\mu\text{mhos/cm}$.

TABLE 2 (CONTINUED)

APRIL 19, 1989

STATION QR08

Depth (m)	Turb (NTU)	color (CU)	Cond	Cl	Alk	Hard (SU)	pH	Dissolved		Temp (°C)	Solids		Nitrogen			TP
								Oxygen (mg/l)	(%Sat)		Total	Fixed	TKN	NH ₃	NO ₃	
0.5	0.4	5	43	6.0	4.0	9	7.2	11.3	98	8.9	28	18	0.04	<0.02	0.03	0.004
5			44				7.2	11.1	95	8.3						
10			44				7.1	11.3	94	7.4						
15	0.5	6	43	8.0	3.9	9	7.0	11.1	91	6.8	30	20	<0.03	<0.02	0.02	0.004

STATION QR10

Depth (m)	Turb (NTU)	color (CU)	cond	Cl	Alk	Hard (SU)	pH	Dissolved			Temp (°C)	solids		Nitrogen			TP
								Oxygen (mg/l)	(%Sat)	Total		Fixed	TKN	NH ₃	NO ₃		
0.5	0.6	20	54	8.5	3.7	9	6.6	11.3	98	8.9	38	24	0.16	0.02	0.07	0.01	
5			53				6.7	11.1	94	7.9							
10	0.4	20	53	9.5	3.7	10	6.7	10.9	90	6.8	39	24	0.03	<0.02	0.06	0.007	

Note: Conductivity in $\mu\text{mhos/cm}$.

TABLE 3

QUABBIN RESERVOIR WATER QUALITY AND SEDIMENT DATA REPORT

CHEMICAL AND NUTRIENT DATA (mg/l)

MAY 18, 1989

STATION QR01

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk Hard	pH	Dissolved		Temp (°C)	Solids		Nitrogen		TP
							Oxygen (mg/l)	(%Sat)		Total	Fixed	TKN	NH ₃ NO ₃	
0.5	0.3	5	40	6.0	3.2	8	7.5	11.2	107	13.7	76	57	0.21 <0.02	0.02 <0.005
5			40				7.4	10.9	102	12.4				
10			40				7.3	11.1	102	11.8				
15			39				7.4	12.0	105	9.5				
20			39				7.3	11.6	99	8.3				
25			39				7.2	11.5	96	7.5				
30			39				7.2	11.4	95	7.3				
35	0.3	5	40	6.0	3.3	8	7.1	11.3	93	7.2	77	56	0.28 <0.02	0.03 <0.005
36.5														

STATION QR02

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk Hard	pH	Dissolved		Temp (°C)	Solids		Nitrogen		TP
							Oxygen (mg/l)	(%Sat)		Total	Fixed	TKN	NH ₃ NO ₃	
0.5	0.3	5	40	7.0	3.1	8	7.3	11.7	112	13.3	27	20	0.28 <0.02	<0.005
5			40				7.3	11.4	106	12.6				
10			39				7.3	11.5	105	11.6				
15			38				7.4	11.4	100	9.4				
20			38				7.3	11.5	99	8.8				
25			38				7.3	11.7	99	8.0				
30	0.3	5	39	7.0	3.3	8	7.2	11.5	97	7.8	81	59	0.25 <0.02	0.02 <0.005
30.5														

NOTE: Conductivity in $\mu\text{mhos/cm}$.

TABLE 3 (CONTINUED)

MAY 18, 1989

STATION QR03

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard	pH	Dissolved		Temp (°C)	Solids			Nitrogen		TP
								Oxygen (mg/l)	(%Sat)		Total	Fixed	TKN	NH ₃	NO ₃	
0.5	0.3	8	40	6.5	2.8	7	7.2	12.1	113	12.6	28	24	0.23	<0.02	0.02	<0.005
5		40					7.3	11.8	103	9.3						
10		39					7.3	11.7	100	8.7						
15		39					7.3	11.4	97	8.3						
20	0.3	5	39	6.0	3.1	9	7.2	11.1	94	8.2	78	57	0.20	<0.02	<0.02	0.009
22.9																

STATION QR04

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard	pH	Dissolved		Temp (°C)	Solids			Nitrogen		TP
								Oxygen (mg/l)	(%Sat)		Total	Fixed	TKN	NH ₃	NO ₃	
0.5	0.4	5	41	6.5	3.3	9	7.3	11.3	107	12.9	74	54	0.46	<0.02	<0.02	<0.005
5		41					7.3	11.1	104	12.3						
10		40					7.3	11.2	105	12.4						
15		39					7.3	11.3	100	9.8						
20		39					7.2	11.5	98	8.4						
25		38					7.2	11.6	98	7.9						
30		39					7.2	11.4	95	7.5						
34	0.3	5	39	6.0	3.4	8	7.1	11.3	93	7.2	80	59	0.27	<0.02	0.02	0.006
36.6																

NOTE: Conductivity in $\mu\text{mhos/cm}$.

TABLE 3 (CONTINUED)

MAY 18, 1989

STATION QR06

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk Hard	pH	Dissolved				Solids				Nitrogen		
							Oxygen (mg/l)	(%Sat)	Temp (°C)	Total	Fixed	TKN	NH ₃	NO ₃	TP		
0.5	0.4	5	40	6.5	3.2	8.5	7.1	10.8	100	11.2	74	54	0.26	<0.02	0.02	<0.005	
5			41				7.1	11.6	105	10.1							
10			41				7.1	11.8	106	9.6							
15			40				7.1	11.7	104	8.7							
20			40				7.1	11.6	102	8.4							
25	0.3	5	40	6.5	3.3	8	7.1	11.3	99	8.3	71	53	0.45	<0.02	<0.02	0.007	
25.9																	

STATION QR07

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk Hard	pH	Dissolved				Solids				Nitrogen		
							Oxygen (mg/l)	(%Sat)	Temp (°C)	Total	Fixed	TKN	NH ₃	NO ₃	TP		
0.5	0.5	7	44	6.5	3.4	10	7.1	11.3	109	13.8	29	26	0.13	<0.02	0.02	0.010	
5			41				7.2	11.1	98	10.1							
10			41				7.1	11.1	96	9.0							
15			41				7.1	11.3	98	8.9							
20			40				7.1	11.3	97	8.7							
21	0.4	5	40	6.5	3.4	8	7.0	11.3	97	8.6	77	57	0.18	<0.02	<0.02	0.007	
21.3																	

NOTE: Conductivity in $\mu\text{mohs/cm}$.

TABLE 3 (CONTINUED)

MAY 18, 1989

STATION QR09

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard	pH	Dissolved		Temp (°C)	Solids		Nitrogen			TP
								Oxygen (mg/l)	(%Sat)		Total	Fixed	TKN	NH ₃	NO ₃	
0.5	0.5	13	45	7.0	3.3	8	6.9	10.0	101	15.8	31	26	0.31	<0.02	0.02	0.005
5			50				6.8	12.0	110	11.4						
10			41				6.8	12.0	105	9.7						
13			41				6.8	11.1	96	9.2						
14	0.5	5	41	6.5	3.4	8	6.8	11.1	96	9.2	70	53	0.43	<0.02	<0.02	0.007

STATION QR10

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard	pH	Dissolved		Temp (°C)	Solids		Nitrogen			TP
								Oxygen (mg/l)	(&Sat)		Total	Fixed	TKN	NH ₃	NO ₃	
0.5	0.5	33	51	8.0	3.0	9	6.7	9.2	98	18.8	40	33	1.80	<0.02	0.03	0.011
5			51				6.5	13.2	127	13.8						
10			52				6.5	12.0	107	10.6						
15			53				6.4	9.6	84	9.5						
16	0.6	23	52	8.5	3.3	9	6.3	9.3	80	9.2	38	34	0.41	0.02	0.07	0.014
16.5																

NOTE: Conductivity in $\mu\text{mhos/cm}$.

TABLE 4

QUABBIN RESERVOIR WATER QUALITY AND SEDIMENT DATA REPORT

CHEMICAL AND NUTRIENT DATA (mg/l)

JUNE 14, 1989

STATION QR01

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard	pH	Dissolved		Temp (°C)	Solids		Nitrogen		TP
								Oxygen (mg/l)	(%Sat)		Total	Fixed	TKN	NH ₃ NO ₃	
0.5	0.3	5	41	5.0	3.4	9	7.6	8.9	93	18.2	79	59	0.48	0.02 <0.02	<0.005
1			41				7.6	8.9	93	18.2					
2			41				7.5	8.9	93	18.2					
3			41				7.5	8.9	93	18.2					
4			41				7.5	8.8	92	18.2					
5			41				7.5	8.9	93	18.1					
6			41				7.5	8.9	93	18.0					
7			42				7.4	8.9	93	17.9					
8			41				7.4	8.8	92	17.9					
9			41				7.4	9.1	95	17.7					
10	0.3	5	41	5.0	3.5	9	7.4	9.7	98	16.2	76	56	0.39	0.02 <0.02	<0.005
11			41				7.4	10.2	94	14.2					
12			41				7.4	10.5	97	12.1					
13	0.3	5	41	5.0	3.6	9	7.4	10.6	96	10.9	73	53	0.42	<0.02 0.03	0.006
14			41				7.3	10.6	96	10.8					
15			41				7.3	10.6	94	10.1					
16			41				7.3	10.7	94	9.8					
17			41				7.2	10.6	93	9.7					
18			41				7.2	10.6	93	9.5					
19			41				7.2	10.6	93	9.4					
20			41				7.2	10.6	93	9.3					
25			41				7.1	10.5	90	8.7					
30			41				7.1	10.4	88	8.1					
35	0.2	5	41	5.5	3.6	11	7.0	10.0	83	7.7	78	58	0.41	0.02 <0.02	<0.005
36.2															

NOTE: Conductivity in $\mu\text{mhos/cm}$.

TABLE 4 (CONTINUED)

JUNE 14, 1989

STATION QR02

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard	pH	Dissolved		Temp (°C)	Solids		Nitrogen			TP
								Oxygen (mg/l)	(%Sat)		Total	Fixed	TKN	NH ₃	NO ₃	
0.5	0.3	5	41	6.0	3.5	10	7.0	8.8	93	18.7	79	60	0.39	<0.02	<0.02	<0.005
1			41				7.0	8.9	94	18.4						
2			40				7.0	8.9	93	18.2						
3			41				7.0	8.9	93	18.1						
4			41				7.0	8.9	93	18.0						
5			41				7.0	8.9	93	18.0						
6			41				7.0	9.0	95	18.0						
7			40				7.0	8.9	93	17.9						
8			41				7.0	8.9	93	17.9						
9			40				7.0	8.9	93	17.9						
10	0.3	5	41	6.0	3.4	9	7.0	9.6	96	15.5	77	59	0.45	<0.02	<0.02	0.007
11			42				7.0	10.0	94	13.2						
12	0.3	5	42	5.5	3.5	9	6.9	10.1	93	12.2	74	56	0.31	0.02	<0.02	0.007
13			42				6.9	10.2	93	11.4						
14			42				6.9	10.2	92	10.8						
15			41				6.9	10.2	91	10.6						
20			41				6.8	10.1	89	9.8						
25			40				6.7	10.0	87	9.3						
30			41				6.7	9.7	83	8.5						
35	0.3	5	41	5.5	3.6	9	6.6	9.6	82	8.3	76	57	0.27	<0.02	0.03	0.006
35.9																

NOTE: Conductivity in $\mu\text{mhos/cm}$.

TABLE 4 (CONTINUED)

JUNE 14, 1989

STATION QR03

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard	pH	Dissolved		Temp (°C)	Solids			Nitrogen		TP
								Oxygen (mg/l)	(%Sat)		Total	Fixed	TKN	NH ₃	NO ₃	
0.5	0.3	5	41	6.0	3.5	8	6.8	9.2	97	18.1	81	62	0.42	0.04	0.05	<0.005
1			41				6.8	9.1	96	18.1						
2			41				6.8	9.1	95	17.6						
3			41				6.8	9.1	95	17.4						
4			41				6.8	9.1	95	17.4						
5			41				6.8	9.2	95	17.1						
6			41				6.8	9.3	95	16.3						
7			41				6.7	9.4	94	15.7						
8	0.3	5	42	6.0	3.4	8	6.7	9.4	93	15.0	37	30	0.36	<0.02	0.02	<0.005
9			41				6.6	9.6	92	13.3						
10			42				6.6	9.7	90	12.0						
11			42				6.6	9.7	89	11.3						
12			41				6.6	9.7	87	10.7						
15			41				6.5	9.7	86	10.1						
20			41				6.5	9.6	85	9.8						
21	0.3	5	41	6.5	3.6	8	6.4	9.6	85	9.8	69	52	0.49	<0.02	0.03	0.005
22.1																

NOTE: Conductivity in $\mu\text{mhos/cm}$.

TABLE 4 (CONTINUED)

JUNE 14, 1989

STATION QR04

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard	pH	Dissolved		Temp (°C)	Solids		Nitrogen			TP
								Oxygen (mg/l)	(%Sat)		Total	Fixed	TKN	NH ₃	NO ₃	
0.5	0.3	5	41	5.5	3.5	8	7.1	9.0	95	18.3	75	55	0.31	<0.02	0.02	<0.005
1			41				7.1	8.9	93	18.1						
2			42				7.1	8.9	93	18.0						
3			42				7.1	8.9	93	18.0						
4			42				7.1	8.9	93	18.0						
5			42				7.1	8.9	93	18.0						
6			42				7.1	8.9	93	17.9						
7			42				7.1	8.9	93	17.9						
8			41				7.1	8.9	93	17.7						
9			41				7.1	9.0	94	17.5						
10	0.3	5	41	5.5	3.6	8	7.1	9.7	97	15.5	67	52	0.65	<0.02	0.02	0.006
11			41				7.1	9.8	96	14.3						
12			41				7.1	9.8	93	12.8						
13	0.3	5	41	5.5	3.7	11	7.0	10.2	92	11.2	67	51	0.44	0.03	0.07	<0.005
14			41				7.0	10.3	93	10.8						
15			41				7.0	10.4	93	10.3						
16			41				6.9	10.2	90	10.2						
18			41				6.9	10.3	90	9.6						
20			41				6.9	10.3	90	9.6						
25	0.3	5	42	5.5	3.7	9	6.8	10.3	89	8.9	73	55	0.48	<0.02	0.02	<0.005
25.6																

NOTE: Conductivity in $\mu\text{mhos/cm}$.

TABLE 4 (CONTINUED)

JUNE 14, 1989

STATION QR06

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard	pH	Dissolved			Temp (°C)	Solids		Nitrogen			TP
								Oxygen (mg/l)	(%Sat)	Total		Fixed	TKN	NH ₃	NO ₃		
0.5	0.3	5	40	6.0	3.5	11	6.1	8.8	92	17.9	77	58	0.51	0.04	<0.02	0.006	
1			40				6.4	8.6	90	17.9							
2			40				6.4	8.7	91	17.8							
3			40				6.4	8.7	91	17.8							
4			40				6.5	8.8	92	17.7							
5			40				6.5	8.7	90	17.6							
6			40				6.5	8.9	93	17.5							
7	0.3	5	40	5.5	3.5	8	6.5	9.1	93	16.6	75	59	0.43	<0.02	<0.02	<0.005	
8			39				6.4	9.2	92	15.7							
9			38				6.4	9.4	92	14.3							
10			40				6.3	9.9	94	13.7							
11			39				6.3	9.6	91	12.8							
12	0.3	5	40	6.0	3.7	8	6.2	9.7	90	11.8	75	59	0.39	<0.02	<0.02	<0.005	
13			39				6.2	9.6	88	11.3							
14			40				6.2	9.6	86	10.7							
15			39				6.1	9.6	86	10.3							
16			40				6.1	9.6	85	10.1							
21			39				6.0	9.4	82	9.3							
23.5	0.3	5	39	5.5	3.8	11	6.0	9.1	79	9.0	76	59	0.35	0.07	0.05	0.005	

NOTE: Conductivity in $\mu\text{mhos/cm}$.

TABLE 4 (CONTINUED)

JUNE 14, 1989

STATION QRO7

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk Hard	pH	Dissolved		Temp (°C)	Solids			Nitrogen		TP
							Oxygen (mg/l)	(%Sat)		Total	Fixed	TKN	NH ₃	NO ₃	
0.5	0.3	5	41	6.0	3.6	9	6.4	8.9	94	72	56	0.47	<0.02	<0.02	<0.005
1		39				6.4	8.8	92	18.2						
2		40				6.5	8.9	93	17.5						
3		40				6.5	9.0	94	17.4						
4		40				6.5	9.0	94	17.3						
5		40				6.5	9.0	93	17.2						
6		40				6.5	9.0	93	17.1						
7	0.4	5	40	5.5	3.7	8	6.5	9.0	92	69	55	0.40	<0.02	0.02	0.005
8		39				6.4	8.9	85	13.6						
9		40				6.2	9.0	84	12.4						
10		40				6.1	9.1	84	11.9						
11	0.3	5	40	6.0	3.8	8	6.0	9.0	82	61	49	0.43	0.03	0.03	<0.005
12		40				6.0	9.0	81	11.0						
17		40				5.9	9.0	80	10.5						
20	0.3	5	39	6.5	3.8	9	5.9	9.1	81	71	55	0.45	0.02	0.02	<0.005
21															

NOTE: Conductivity in $\mu\text{mhos/cm}$.

TABLE 4 (CONTINUED)

JUNE 14, 1989

STATION QR09

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard	pH	Dissolved		Temp (°C)	Solids		Nitrogen			TP
								Oxygen (mg/l)	(%Sat)		Total	Fixed	TKN	NH ₃	NO ₃	
0.5	0.4	15	44	6.5	3.7	8	6.2	8.7	93	19.2	30	25	1.10	<0.02	<0.02	0.010
1			44				6.2	8.4	90	18.8						
2			42				6.3	8.5	89	18.1						
3			42				6.3	8.4	88	17.8						
4			42				6.3	8.4	87	17.7						
5			42				6.3	8.5	88	17.3						
6			41				6.2	8.2	84	16.9						
7	0.4	10	42	6.5	3.7	9	6.1	8.1	83	16.3	56	46	0.53	<0.02	<0.02	0.010
8			43				5.7	7.6	74	14.4						
9			45				5.7	7.4	70	13.1						
10			46				5.7	7.2	67	12.4						
11	0.4	15	47	7.0	3.7	9	5.7	7.2	66	11.8	31	31	0.42	0.03	0.04	0.007
12			46				5.6	7.1	65	11.6						
13	0.4	15	47	7.0	3.8	9	5.6	7.0	64	11.4	34	33	0.41	0.04	0.05	0.007
13.7																

NOTE: Conductivity in $\mu\text{mhos/cm}$.

TABLE 4 (CONTINUED)

JUNE 14, 1989

STATION QR10

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard	pH	Dissolved		Temp (°C)	Solids		Nitrogen			TP
								Oxygen (mg/l)	(%Sat)		Total	Fixed	TKN	NH ₃	NO ₃	
0.5	0.5	35	48	8.0	3.8	12	6.1	7.8	84	19.7	37	30	1.10	0.02	<0.02	0.011
1			48				6.1	7.8	83	19.2						
2			48				6.1	7.8	83	18.9						
3			48				6.1	7.6	81	18.8						
4			48				6.1	7.6	81	18.7						
5			47				6.0	7.4	78	18.4						
6			48				5.9	7.2	75	17.7						
7	0.6	45	48	8.5	3.8	13	5.7	6.9	70	16.3	38	33	0.58	0.05	0.02	0.015
8			48				5.7	6.9	67	14.5						
9			48				5.7	7.0	66	13.1						
10			48				5.7	7.2	66	12.0						
11	0.5	25	48	8.0	3.7	13	5.7	7.2	65	11.2	34	34	0.72	0.03	0.04	0.011
12			49				5.7	7.2	65	10.8						
13			49				5.7	7.0	63	10.6						
16	0.5	22	50	8.0	3.8	12	5.6	6.9	61	10.0	36	36	0.67	0.04	0.06	0.010
16.5																

NOTE: Conductivity in $\mu\text{mhos/cm}$.

TABLE 5

QUABBIN RESERVOIR WATER QUALITY AND SEDIMENT DATA REPORT

CHEMICAL AND NUTRIENT DATA (mg/l)

JULY 19, 1989

STATION QR01

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard (SU)	pH	Dissolved				Temp (°C)	Solids		Nitrogen		TP
								Oxygen (mg/l)	(%Sat)	Total	Fixed		TKN	NH ₃	NO ₃		
0.5	0.2	5	43	5.0	3.5	10	7.1	9.0	102	22.0	68	50	0.21	<0.02	0.03	<0.005	
1			43				7.0	9.3	103	21.0							
2			43				7.0	10.2	115	22.0							
3			43				7.0	11.0	124	21.9							
4			43				7.0	11.7	131	21.7							
5			42				7.0	12.4	139	21.7							
6	0.2	5	42	5.5	3.6	10	7.0	13.1	147	21.6	70	51	0.21	<0.02	0.02	<0.005	
7			43				7.0	13.7	151	20.7							
8			43				7.1	13.4	143	18.8							
9			43				7.1	13.1	135	17.0							
10			43				7.1	12.7	126	15.4							
11			43				7.1	12.5	122	14.6							
12	0.2	5	43	5.0	3.6	9	7.2	12.3	119	13.8	73	53	0.28	<0.02	0.02	<0.005	
13			43				7.2	12.0	113	13.0							
14			43				7.1	11.5	106	12.2							
15			43				7.1	11.6	107	12.0							
16			43				7.0	11.2	102	11.5							
17			43				6.9	11.0	99	11.2							
18			43				6.8	10.6	96	10.8							
19			43				6.8	10.5	94	10.6							
20			44				6.8	10.6	94	10.5							
21			44				6.7	10.6	95	10.4							
24			44				6.7	10.4	92	10.0							
27			44				6.7	10.4	91	9.4							
30			44				6.6	10.0	87	8.9							
33			43				6.5	9.5	81	8.4							
35	0.2	5		5.0	3.7	10					74	53	0.22	0.03	0.04	<0.005	
36			44				6.4	9.2	78	8.2							

NOTE: Conductivity in $\mu\text{mhos/cm}$.

TABLE 5 (CONTINUED)

JULY 19, 1989

STATION QR02

Depth (m)	Turb (NTU)	Color (CU)	Dissolved										Solids			Nitrogen			TP
			Cond	Cl	Alk	Hard	pH	Oxygen (mg/l)	Oxygen (%Sat)	Temp (°C)	Total	Fixed	TKN	NH ₃	NO ₃				
0.5	0.2	5	43	5.0	3.5	10	6.7	9.2	104	22.2	70	50	0.20	<0.02	0.03	<0.005			
1			43				6.8	9.5	107	22.2									
2			43				6.8	10.3	116	22.0									
3			43				6.8	11.1	125	21.9									
4			43				6.7	11.8	133	21.9									
5			43				6.7	12.5	141	21.9									
6			43				6.7	12.3	139	21.8									
7	0.2	5	42	5.0	3.5	10	6.7	12.0	136	21.8	72	51	0.21	<0.02	0.03	<0.005			
8			43				6.7	11.6	126	19.8									
9			43				6.8	11.9	124	17.4									
10			43				6.9	11.5	114	15.4									
11			43				6.9	11.4	111	14.3									
12			43				6.9	11.3	107	13.0									
13	0.2	5	44	5.5	3.6	10	6.9	11.1	104	12.6	79	57	0.27	<0.02	0.02	<0.005			
14			43				6.8	10.9	102	12.3									
15			43				6.8	10.7	98	11.7									
16			43				6.5	10.2	92	11.2									
17			43				6.5	10.2	92	10.8									
20			43				6.4	9.9	89	10.4									
23			43				6.3	9.8	87	9.8									
26			44				6.2	9.4	82	9.3									
29			43				6.2	9.4	81	9.0									
30	0.2	5		5.0	3.6	9	*6.0				79	57	0.21	0.02	0.03	<0.005			
31.8																			

* Laboratory analyses.

NOTE: Conductivity in $\mu\text{mhos/cm}$.

TABLE 5 (CONTINUED)

JULY 19, 1989

STATION QR03

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard	pH	Dissolved				Temp (°C)	Solids		Nitrogen			TP
								Oxygen (mg/l)	(%Sat)	Total	Fixed		TKN	NH ₃	NO ₃			
0.5	0.2	5	43	5.0	3.6	9	6.8	9.4	109	23.4	74	54	0.21	<0.02	<0.02	<0.005		
1			43				6.8	9.6	110	23.2								
2			42				6.8	10.3	118	23.1								
3			43				6.8	11.0	127	22.9								
4			43				6.8	11.6	132	22.7								
5			43				6.8	11.4	130	22.7								
6			43				6.7	10.8	123	22.5								
7			43				6.7	10.4	119	22.5								
8	0.2	5	43	5.0	3.6	9	6.7	9.5	107	22.2	81	58	0.22	<0.02	<0.02	0.010		
9			43				6.7	9.8	104	18.5								
10			42				6.7	10.4	103	15.3								
11			42				6.5	10.1	96	13.6								
12			43				6.4	9.5	89	12.4								
13	0.2	5	42	5.0	3.7	9	6.3	9.3	85	11.7	77	56	0.20	<0.02	0.03	0.006		
14			43				6.2	9.2	84	11.5								
15			43				6.1	9.1	83	11.3								
16			43				6.1	9.1	82	11.2								
17			43				6.1	9.0	81	11.1								
20			42				6.0	9.2	83	11.0								
20.5	0.2	5		5.0	3.6	9	*6.0				76	56	0.23	0.02	0.03	<0.005		
21.8																		

* Laboratory analyses.

NOTE: Conductivity in $\mu\text{mhos/cm}$.

TABLE 5 (CONTINUED)

JULY 19, 1989

STATION QR04

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard	pH	Dissolved		Temp (°C)	Solids		Nitrogen		TP
								Oxygen (mg/l)	(%Sat)		Total Fixed	TKN	NH ₃	NO ₃	
0.5	0.2	5	43	5.0	3.6	10	6.8	9.2	104	22.2	69	51	0.20	<0.02	0.005
1			43				6.8	9.5	107	22.1					
2			43				6.8	10.3	116	22.1					
3			43				6.8	11.0	124	22.0					
4			43				6.8	11.7	132	22.0					
5			43				6.8	12.4	140	22.0					
6			43				6.8	13.1	148	21.9					
7	0.2	5	43	5.0	3.6	8	6.8	13.8	155	21.7	70	51	0.21	<0.02	<0.005
8			43				6.8	14.8	163	20.5					
9			43				6.8	15.8	164	17.7					
10			44				6.8	17.3	172	15.4					
11			44				6.7	17.8	174	14.5					
12			44				6.7	16.7	161	13.9					
13	0.3	5	44	5.0	3.7	9	6.7	16.5	154	12.7	69	50	0.23	<0.02	0.006
14			43				6.6	12.7	117	12.0					
15			44				6.5	11.6	106	11.4					
16			44				6.4	10.9	99	11.3					
17			44				6.4	10.2	92	11.2					
20			44				6.3	9.5	85	10.6					
23			44				6.3	9.9	87	10.1					
26			44				6.3	10.0	87	9.7					
29	0.2	5	44	5.0	3.7	10	6.3	9.7	84	9.1	65	48	0.23	0.03	<0.005
30			44				6.1	9.7	84	9.0				*	

*Sample discarded due to sampling error.

NOTE: Conductivity in $\mu\text{mhos/cm}$.

TABLE 5 (CONTINUED)

JULY 19, 1989

STATION QR06

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard (SU)	pH	Dissolved		Temp (°C)	Solids		Nitrogen			TP
								Oxygen (mg/l)	(%Sat)		Total	Fixed	TKN	NH ₃	NO ₃	
0.5	0.2	5	42	5.5	3.1	9	6.1	8.1	92	22.4	57	43	0.27	<0.02	0.03	<0.005
1			41				6.3	8.0	91	22.4						
2			41				6.4	8.0	91	22.4						
3			41				6.4	8.0	91	22.4						
4			41				6.4	8.0	91	22.4						
5			41				6.4	8.0	91	22.4						
6			41				6.4	7.9	90	22.3						
7	0.2	5	41	5.5	3.5	9	6.4	7.9	90	22.3	59	44	0.23	<0.02	<0.02	<0.005
8			43				6.4	8.0	90	21.8						
9			41				6.4	10.0	101	15.9						
10			41				6.4	10.3	99	14.0						
11	0.2	5	41	5.0	3.6	9	6.2	9.9	93	13.2	56	42	0.29	<0.02	<0.02	0.009
12			41				6.1	9.6	90	12.7						
13			41				6.0	9.5	89	12.3						
14			41				5.9	9.2	85	11.9						
17			41				5.7	8.6	78	10.9						
20			41				5.7	8.4	75	10.5						
24	0.2	5	41	5.0	3.9	9	5.6	7.7	68	9.9	64	48	0.41	<0.02	<0.02	0.007
25																

NOTE: Conductivity in $\mu\text{mhos/cm}$.

TABLE 5 (CONTINUED)

JULY 19, 1989

STATION QR07

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard	pH	Dissolved			Temp (°C)	Solids		Nitrogen			TP
								Oxygen (mg/l)	(%Sat)	Total		Fixed	TKN	NH ₃	NO ₃		
0.5	0.2	5	42	5.0	3.8	8	6.2	8.0	91	22.6	52	39	0.26	<0.02	<0.02	<0.005	
1			42				6.3	7.8	89	22.5							
2			42				6.4	7.9	90	22.5							
3			42				6.4	7.9	90	22.4							
4			42				6.4	7.8	89	22.4							
5			41				6.4	7.8	89	22.4							
6			41				6.4	7.8	89	22.4							
7	0.2	5	41	5.5	3.7	8	6.4	7.8	89	22.4	61	45	0.40	<0.02	<0.02	0.008	
8			41				6.4	7.7	87	22.2							
9			41				6.1	7.9	86	19.9							
10			42				5.8	7.4	75	16.7							
11			42				5.7	7.3	71	14.3							
12			42				5.6	7.4	71	13.6							
13	0.2	5	42	5.5	3.7	9	5.6	7.4	70	13.0	64	47	0.37	<0.02	<0.02	0.009	
14			42				5.6	7.4	69	12.7							
17			41				5.6	7.5	69	12.1							
19.7	0.2	5	41	5.0	3.9	8	5.6	7.6	72	11.7	68	50	0.26	<0.02	<0.02	<0.005	
20.7																	

NOTE: Conductivity in $\mu\text{mhos/cm}$.

TABLE 5 (CONTINUED)

JULY 19, 1989

STATION QR09

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard	pH	Dissolved		Temp (°C)	Solids			Nitrogen		TP
								Oxygen (mg/l)	(%Sat)		Total	Fixed	TKN	NH ₃	NO ₃	
0.5	0.2	10	44	6.5	3.8	9	6.2	7.8	90	23.4	56	41	0.35	<0.02	<0.02	0.006
1		43					6.2	7.8	90	23.2						
2		42					6.3	7.9	90	22.7						
3		42					6.3	7.7	88	22.6						
4		42					6.4	7.8	89	22.6						
5		42					6.4	7.7	88	22.6						
6		42					6.4	7.7	88	22.5						
7	0.2	7	42	6.5	3.7	8	6.3	7.7	88	22.5	69	51	0.50	<0.02	<0.02	<0.005
8		42					6.3	7.7	88	22.5						
9		42					5.9	7.4	78	18.3						
10		43					5.7	6.8	70	16.9						
11		44					5.5	6.2	62	15.8						
12	0.3	7	46	6.0	3.9	9	5.5	5.9	56	13.5	35	28	0.56	<0.02	<0.02	<0.005
13		46					5.4	5.5	51	12.6						
13.3																

NOTE: Conductivity in $\mu\text{mhos/cm}$.

TABLE 5 (CONTINUED)

JULY 19, 1989

STATION QR10

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard	pH	Dissolved				Temp (°C)	Solids		Nitrogen			TP
								Oxygen (mg/l)	(%Sat)	Total	Fixed		TKN	NH ₃	NO ₃			
0.5	0.3	18	46	6.5	3.9	9	6.2	7.6	90	24.4	33	27	0.25	<0.02	<0.02	0.009		
1			46				6.2	7.5	88	24.0								
2			45				6.3	7.5	87	23.4								
3			45				6.2	7.5	86	23.0								
4			46				6.2	7.4	85	22.9								
5			46				6.1	7.1	81	22.6								
6	0.3	17	46	6.5	3.8	9	5.8	6.4	72	21.7	31	27	0.50	<0.02	0.04	0.019		
7			46				5.6	5.7	63	20.7								
8			47				5.5	4.6	49	18.5								
9			48				5.5	4.8	49	16.6								
10			50				5.4	4.6	45	14.7								
11			50				5.4	5.0	48	13.6								
12			50				5.4	5.7	53	12.3								
13	0.4	22	50	7.0	4.0	10	5.4	5.6	51	11.4	37	33	0.30	0.05	0.06	0.006		
14			51				5.4	5.4	49	11.1								
15	0.3	20	52	7.0	3.9	9	5.4	5.2	46	10.7	34	29	0.60	0.02	<0.02	0.007		
15.8																		

NOTE: Conductivity in $\mu\text{mhos/cm}$.

TABLE 6

QUABBIN RESERVOIR WATER QUALITY AND SEDIMENT DATA REPORT

CHEMICAL AND NUTRIENT DATA (mg/l)

AUGUST 16, 1989

STATION QR01

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard	pH	Dissolved		Temp (°C)	Solids		Nitrogen		TP
								Oxygen (mg/l)	(%Sat)		Total	Fixed	TKN	NH ₃	NO ₃
0.5	0.2	5	42	6.5	3.3	9	7.1	8.7	100	23.1	61	43	0.26	<0.02	<0.005
1			42				7.0	9.5	109	23.0					
2			42				7.0	10.2	117	23.0					
3			42				7.0	11.0	127	23.0					
4			42				6.9	11.6	133	23.0					
5			42				6.9	12.3	140	22.6					
6			42				6.8	13.3	149	21.7					
7	0.2	5	42	6.5	3.0	8	6.8	13.8	155	21.4	64	45	0.32	<0.02	<0.005
8			43				6.8	14.3	159	21.0					
9			42				6.8	14.2	155	19.9					
10			43				6.8	12.7	135	18.5					
11			42				6.8	12.7	131	17.1					
12			42				6.9	12.4	122	14.9					
13			42				6.9	12.0	116	14.0					
14			42				6.9	11.9	112	13.1					
15			42				6.9	11.6	108	12.3					
16			42				6.8	11.4	105	11.9					
17	0.3	5	42	6.5	2.7	9	6.7	11.3	103	11.5	62	44	0.19	<0.02	<0.005
18			42				6.6	10.9	100	11.3					
19			42				6.6	10.4	94	11.1					
20			42				6.3	10.0	90	10.8					
21			43				6.2	9.9	89	10.6					
24			43				6.1	9.6	86	10.3					
27			43				6.1	9.4	82	9.5					
30			42				6.0	9.1	79	9.0					
33			43				6.0	8.6	74	8.6					
36	0.2	5	43	6.0	2.8	9	5.9	8.2	70	8.3	68	46	0.06	<0.02	<0.005
36.9															

NOTE: Conductivity in $\mu\text{mhos/cm}$.

TABLE 6 (CONTINUED)

AUGUST 16, 1989

STATION QR02

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard	pH	Dissolved		Temp (°C)	Solids			Nitrogen		TP
								Oxygen (mg/l)	(%Sat)		Total	Fixed	TKN	NH ₃	NO ₃	
0.5	0.2	5	42	6.5	3.0	9	6.6	8.8	103	24.2	69	51	0.47	<0.02	<0.02	<0.005
1			42				6.7	9.1	106	24.2						
3			42				6.7	9.8	114	23.6						
5			42				6.7	10.1	117	23.4						
7	0.2	5	42	6.5	3.2	8	6.7	9.7	113	23.3	73	54	0.15	<0.02	<0.02	<0.005
8			42				6.7	8.9	101	22.7						
9			41				6.6	9.8	107	20.2						
10			42				6.6	10.2	110	19.7						
11			42				6.7	11.1	113	16.7						
12			43				6.7	11.4	112	15.0						
13			43				6.7	11.6	112	13.8						
14			43				6.7	11.6	110	13.0						
15			43				6.7	11.4	106	12.4						
16			42				6.6	11.4	105	11.8						
17	0.2	5	42	6.0	3.4	9	6.5	10.4	95	11.4	68	50	0.22	<0.02	<0.02	<0.005
20			42				6.2	9.2	83	10.8						
23			42				6.1	9.0	80	10.4						
26			42				6.0	8.6	76	9.8						
29			42				5.9	8.2	71	9.2						
31	0.2	5	43	6.0	3.5	9	5.8	8.1	70	9.0	70	51	0.18	<0.02	0.02	<0.005
31.7																

NOTE: Conductivity in $\mu\text{mhos/cm}$.

TABLE 6 (CONTINUED)

AUGUST 16, 1989

STATION QR03

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard	pH	Dissolved		Temp (°C)	Solids			Nitrogen		TP
								Oxygen (mg/l)	(%Sat)		Total	Fixed	TKN	NH ₃	NO ₃	
0.5	0.2	5	42	6.5	3.4	8	6.6	8.8	104	24.3	66	49	0.20	<0.02	<0.02	<0.005
1			42				6.6	9.2	108	24.2						
3			42				6.6	10.8	126	23.8						
5			42				6.6	12.2	143	23.8						
7	0.2	5	42	6.5	3.4	9	6.6	12.2	142	23.7	66	48	0.16	<0.02	<0.02	<0.005
8			42				6.6	11.7	136	23.6						
9			41				6.5	11.0	125	22.6						
10			41				6.4	11.1	118	18.6						
11			42				6.4	11.2	109	14.6						
12			43				6.4	11.3	108	13.4						
13			43				6.4	10.4	98	12.8						
14			42				6.3	9.5	88	12.1						
15			42				6.1	8.6	79	11.6						
16	0.2	5	43	6.5	3.5	10	6.0	8.4	77	11.4	72	55	0.25	<0.02	0.03	<0.005
19			43				5.8	8.1	73	11.0						
20			43				5.8	8.0	72	10.8						
21	0.3	5	43	6.0	3.7	9	5.8	7.9	71	10.8	76	57	0.45	<0.02	0.02	<0.005
21.5																

NOTE: Conductivity in $\mu\text{mhos/cm}$.

TABLE 6 (CONTINUED)

AUGUST 16, 1989

STATION QR04

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard (SU)	pH	Dissolved		Temp (°C)	Solids		Nitrogen			TP
								Oxygen (mg/l)	(%Sat)		Total	Fixed	TKN	NH ₃	NO ₃	
0.5	0.2	5	43	6.5	3.3	8	7.0	9.2	107	23.3	62	46	0.33	<0.02	<0.02	<0.005
1			43				6.9	9.5	110	23.3						
2			43				6.9	10.2	118	23.3						
3			42				6.9	11.0	127	23.2						
4			42				6.9	11.6	133	23.2						
5			42				6.8	11.6	133	23.1						
6	0.2	5	42	6.5	3.4	8	6.8	10.6	121	22.7	65	49	0.45	<0.02	<0.02	0.009
7			42				6.7	10.2	116	22.7						
8			43				6.7	10.0	111	20.9						
9			43				6.7	10.3	112	20.2						
10			43				6.7	10.8	113	18.2						
11			43				6.7	11.0	113	17.2						
12			43				6.8	11.3	112	15.7						
13			43				6.7	11.1	107	14.1						
14			43				6.6	11.1	106	13.3						
15			43				6.5	10.4	97	12.4						
16			43				6.4	10.3	95	12.0						
17	0.2	5	43	6.0	3.6	8	6.4	10.5	96	11.6	62	45	0.54	<0.02	0.03	0.005
18			41				6.3	10.0	91	11.3						
21			42				6.1	9.0	80	10.7						
24			43				6.0	9.1	81	10.4						
27			43				6.0	9.4	83	9.8						
30			42				5.9	9.2	80	9.3						
32	0.2	5	43	6.0	3.8	8	5.9	8.4	73	8.9	68	49	0.29	<0.02	<0.02	0.009
33.3																

NOTE: Conductivity in $\mu\text{mhos/cm}$.

TABLE 6 (CONTINUED)

AUGUST 16, 1989

STATION QR06

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard	pH	Dissolved				Temp (°C)	Solids		Nitrogen			TP
								Oxygen (mg/l)	(%Sat)	Total	Fixed		TKN	NH ₃	NO ₃			
0.5	0.2	5	41	6.0	3.5	8	6.5	7.7	90	23.9	67	48	0.99	<0.02	0.02	<0.005		
1			41				6.4	7.8	91	23.9								
2			41				6.4	7.6	89	23.9								
3			41				6.4	7.6	89	23.9								
4			41				6.5	7.8	91	23.9								
5			41				6.5	7.7	90	23.9								
6			41				6.5	7.7	90	23.9								
7			41				6.5	7.7	90	23.8								
8	0.2	5	41	6.0	3.6	9	6.4	7.7	90	23.8	70	50	0.40	<0.02	<0.02	<0.005		
9			41				6.4	9.1	100	20.3								
10			41				5.9	8.4	86	16.6								
11			42				5.7	7.7	77	15.6								
12			41				5.7	9.4	92	14.6								
13			41				6.0	10.0	97	13.8								
14	0.5	13	41	7.0	3.9	8	6.0	9.7	92	13.1	65	45	0.59	<0.02	0.02	0.009		
15			41				5.8	8.6	79	12.2								
16			41				5.8	8.7	80	12.0								
17			42				5.7	8.3	76	11.7								
18			41				5.7	7.9	72	11.3								
19			41				5.6	7.6	69	10.9								
20			41				5.6	7.4	66	10.7								
21			41				5.6	7.4	66	10.6								
22			41				5.6	7.1	63	10.4								
23	0.3	8	41	6.0	4.0	10	5.5	6.7	60	10.3	78	55	0.37	<0.02	0.02	<0.005		
24			42				5.5	6.3	56	10.2								
24.2																		

NOTE: Conductivity in $\mu\text{mhos/cm}$.

TABLE 6 (CONTINUED)

AUGUST 16, 1989

STATION QR07

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard (SU)	pH	Dissolved		Temp (°C)	Solids			Nitrogen		TP
								Oxygen (mg/l)	(%Sat)		Total	Fixed	TKN	NH ₃	NO ₃	
0.5	0.3	5	40	7.0	3.6	9	6.5	7.7	91	24.4	69	49	0.60	<0.02	<0.02	<0.005
1			40				6.5	7.6	90	24.4						
2			41				6.5	7.6	89	24.1						
3			41				6.5	7.5	88	23.9						
4			41				6.4	7.8	90	23.7						
5			41				6.4	7.6	88	23.7						
6			41				6.4	7.5	87	23.7						
7			41				6.4	7.5	87	23.7						
8			41				6.4	7.5	87	23.6						
9	0.3	5	41	6.5	3.7	9	6.3	7.5	87	23.5	75	54	0.37	<0.02	<0.02	<0.005
10			41				6.0	7.1	80	22.1						
11			43				5.7	6.3	66	17.6						
12	0.3	13	43	6.5	4.1	9	5.6	6.0	59	14.9	58	43	0.44	<0.02	0.02	0.021
13			43				5.5	5.8	55	13.6						
15			43				5.5	5.9	56	13.0						
18			42				5.5	6.3	58	11.7						
20	0.4	10		6.0	4.0	9					75	53	0.57	0.02	0.03	<0.005

NOTE: Conductivity in $\mu\text{mhos/cm}$.

TABLE 6 (CONTINUED)

AUGUST 16, 1989

STATION QR09

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard	pH	Dissolved		Temp (°C)	Solids			Nitrogen		TP
								Oxygen (mg/l)	(%Sat)		Total	Fixed	TKN	NH ₃	NO ₃	
0.5	0.3	10	43	6.5	3.9	9	6.3	7.5	90	25.3	87	61	0.29	<0.02	<0.02	<0.005
1			43				6.4	7.4	88	25.0						
2			43				6.4	7.5	89	24.9						
3			42				6.4	7.5	89	24.5						
4			42				6.4	7.5	89	24.3						
5			41				6.4	7.6	89	24.1						
6			41				6.4	7.4	87	24.1						
7			41				6.4	7.5	88	24.0						
8			41				6.4	7.4	87	23.9						
9	0.3	5	41	6.5	3.6	9	6.3	7.3	84	23.2	73	53	0.26	<0.02	<0.02	<0.005
10			43				5.8	6.3	71	21.3						
11			43				5.6	5.9	64	19.9						
12			49				5.4	3.5	34	14.3						
13	0.4	23	49	6.5	4.2	9	5.4	3.2	31	13.9	36	31	0.50	0.03	0.06	<0.005
14			49				5.4	3.2	31	13.9						
14.5																

NOTE: Conductivity in $\mu\text{mhos/cm}$.

TABLE 6 (CONTINUED)

AUGUST 16, 1989

STATION QR10

Depth (m)	Turb (NTU)	color (CU)	Cond	cl	Alk	Hard (SU)	pH	Dissolved			Temp (°C)	Solids		Nitrogen		TP
								Oxygen (mg/l)	(%sat)	Total		Fixed	TKN	NH ₃	NO ₃	
0.5	0.4	12	44	7.0	4.1	10	6.2	7.7	91	24.6	51	39	0.51	<0.02	0.28	<0.005
1		44	44				6.2	7.5	89	24.5						
2		44	44				6.2	7.4	87	24.3						
3		44	44				6.3	7.4	87	24.0						
4		44	44				6.2	7.2	84	23.6						
5		44	44				6.2	7.1	82	23.4						
6		44	44				6.0	7.1	82	22.9						
7		49	49				5.9	6.4	73	22.5						
8	0.8	33	50	8.0	5.4	9	5.8	6.3	71	22.2	40	33	0.58	0.02	<0.02	0.008
9		47	47				5.6	4.0	44	20.8						
10		49	49				5.4	2.7	29	18.3						
11		49	49				5.4	2.8	28	15.4						
12	0.5	30	51	8.0	4.7	9	5.4	3.3	31	12.7	38	35	0.40	0.06	0.05	0.005
13		51	51				5.4	3.4	31	12.1						
14	0.6	27	51	8.0	4.2	10	5.4	3.5	32	11.5	39	35	0.27	0.02	0.11	0.005
15		51	51				5.3	2.7	24	10.9						

NOTE: conductivity in $\mu\text{mhos/cm}$.

TABLE 7

QUABBIN RESERVOIR WATER QUALITY AND SEDIMENT DATA REPORT

CHEMICAL AND NUTRIENT DATA (mg/l)

SEPTEMBER 21, 1989

STATION QR01

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard	pH	Dissolved		Temp (°C)	Solids		Nitrogen		TP	
								Oxygen (mg/l)	(%Sat)		Total	Fixed	TKN	NH ₃		NO ₃
0.5	0.2	5	41	6.5	3.5	9	6.3	9.3	103	21.0	34	23	0.43	<0.02	0.03	0.017
1			41				6.4	9.3	103	21.0						
2			41				6.4	10.0	111	21.0						
3			41				6.4	10.2	113	21.0						
4			41				6.3	10.4	115	20.9						
5			41				6.3	10.4	115	20.9						
6			41				6.3	10.4	115	20.9						
7			40				6.4	10.2	113	20.9						
8			40				6.4	10.7	113	20.8						
9			40				6.4	10.5	116	20.7						
10	0.2	5	40	6.5	3.5	9	6.4	10.3	113	20.7	34	24	0.23	<0.02	<0.02	0.010
11			41				6.4	10.1	111	20.5						
12			40				6.4	11.3	115	16.5						
13			40				6.3	11.3	111	14.9						
14			40				6.3	10.4	100	13.9						
15			40				6.2	10.5	100	13.3						
16			41				6.0	9.7	92	12.8						
17	0.2	5	40	6.0	3.5	11	5.9	9.3	86	12.2	34	23	0.34	<0.02	0.02	0.012
18			40				6.3	9.2	85	12.0						
19			40				5.9	9.2	84	11.7						
20			40				5.8	9.0	82	11.6						
21			40				5.8	8.7	80	11.3						
24			39				5.7	8.0	72	10.7						
27			40				5.6	7.7	68	9.9						
30			41				5.6	7.2	62	9.2						
33			40				5.5	6.5	56	8.8						
36			41				5.5	5.8	50	8.5						
39	0.3	5	40	6.0	3.7	11	5.4	5.0	43	8.4	34	23	0.30	0.02	0.04	0.012

NOTE: Conductivity in $\mu\text{mhos/cm}$.

TABLE 7 (CONTINUED)

SEPTEMBER 21, 1989

STATION QR02

Depth (m)	Turb Color (NTU)	Color (CU)	Cond	Cl	Alk	Hard	pH	Dissolved		Temp (°C)	Solids			Nitrogen		TP
								Oxygen (mg/l)	(%Sat)		Total	Fixed	TKN	NH ₃	NO ₃	
0.5	0.2	5	41	6.5	3.5	9	6.1	9.1	101	21.0	34	22	0.36	<0.02	<0.02	0.007
1			41				6.4	9.4	104	21.0						
2			40				6.4	10.0	111	20.8						
3			40				6.4	10.8	120	20.8						
4			40				6.4	11.5	128	20.8						
5			40				6.4	12.3	137	20.8						
6			40				6.4	13.2	147	20.8						
7			40				6.4	13.0	143	20.7						
8			40				6.4	13.1	144	20.7						
9	0.2	5	40	6.5	3.5	8	6.4	13.1	144	20.7	33	21	0.38	<0.02	<0.02	0.006
10			40				6.4	13.2	145	20.5						
11			40				6.4	13.6	147	19.5						
12			40				6.3	14.2	146	17.0						
13			40				6.2	14.3	141	14.8						
14			40				6.1	14.1	135	13.6						
15			41				5.9	13.3	126	12.9						
16			40				5.7	12.1	112	12.1						
17			40				5.7	11.8	109	12.0						
18	0.3	5	41	6.5	3.6	9	5.7	11.0	101	11.7	33	22	0.19	<0.02	<0.02	0.006
19			41				5.7	10.4	95	11.6						
22			40				5.6	8.0	72	11.0						
25			40				5.6	7.5	67	10.5						
28			40				5.5	6.8	59	9.6						
31			40				5.4	5.8	50	9.1						
34			40				5.4	5.5	48	8.9						
34.5	0.3	5	40	6.0	4.0	8	5.4	5.2	45	8.9	34	23	0.25	0.04	0.03	0.010

NOTE: Conductivity in $\mu\text{mhos/cm}$.

TABLE 7 (CONTINUED)

SEPTEMBER 21, 1989

STATION QR03

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard	pH	Dissolved		Temp (°C)	Solids			Nitrogen		TP
								Oxygen (mg/l)	(%Sat)		Total	Fixed	TKN	NH ₃	NO ₃	
0.5	0.2	5	41	6.5	3.5	8	6.4	8.5	95	21.4	33	22	0.26	<0.02	<0.02	0.006
1			41				6.4	8.7	97	21.1						
2			40				6.4	9.2	102	20.9						
3			40				6.4	9.5	105	20.8						
4			40				6.4	9.8	109	20.8						
5			40				6.4	10.0	110	20.7						
6			40				6.4	10.0	110	20.6						
7			40				6.4	9.8	108	20.6						
8			40				6.3	9.6	106	20.5						
9			40				6.3	9.2	101	20.4						
10	0.2	5	40	6.0	3.6	10	6.3	9.1	100	20.3	33	17	0.29	<0.02	<0.02	0.008
11			40				6.2	8.9	97	20.0						
12			40				6.1	8.7	92	18.6						
13			40				6.0	9.1	92	15.8						
14			40				5.9	8.2	79	14.1						
15			40				5.7	7.6	72	12.9						
16			41				5.6	6.8	63	12.2						
17	0.3	5	41	6.0	4.0	10	5.6	6.5	60	11.9	34	19	0.23	0.02	0.02	0.024
18			41				5.5	6.4	58	11.7						
19			41				5.5	6.3	58	11.6						
20	0.3	5	41	6.0	3.9	9	5.5	6.2	57	11.4	33	18	0.25	<0.02	0.02	0.018
20.5			41				5.5	6.2	57	11.4						

NOTE: Conductivity in $\mu\text{mhos/cm}$.

TABLE 7 (CONTINUED)

SEPTEMBER 21, 1989

STATION QR04

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard	pH	Dissolved			Temp (°C)	Solids		Nitrogen			TP
								Oxygen (mg/l)	(%Sat)	Total Fixed		TKN	NH ₃	NO ₃			
0.5	0.2	5	40	6.5	3.6	8	6.4	8.8	98	21.0	34	18	0.22	<0.02	<0.02	0.007	
1			40				6.5	9.2	102	21.0							
2			40				6.5	10.0	111	20.8							
3			40				6.5	10.9	121	20.8							
4			40				6.4	11.6	128	20.7							
5			40				6.4	12.4	136	20.7							
6			40				6.4	13.1	144	20.7							
7			40				6.4	13.9	153	20.7							
8			40				6.4	14.5	160	20.6							
9	0.2	5	40	6.0	3.6	8	6.4	14.9	164	20.6	33	18	0.34	<0.02	<0.02	0.010	
10			40				6.4	14.5	160	20.4							
11			40				6.3	14.7	159	19.6							
12			40				6.2	15.1	156	17.1							
13			41				5.9	15.0	148	15.2							
14			40				5.8	15.5	150	13.9							
15			41				5.7	15.7	148	13.0							
16			40				5.7	15.0	140	12.6							
17	0.3	5	40	6.0	3.7	8	5.6	14.3	132	12.0	35	20	0.25	<0.02	<0.02	0.008	
18			41				5.6	13.5	123	11.6							
19			41				5.6	12.7	116	11.5							
20			40				5.6	12.3	112	11.3							
23			40				5.5	9.4	85	10.8							
26			39				5.5	9.0	80	10.3							
28	0.2	5	41	6.0	3.8	8	5.5	7.7	67	9.4	34	20	0.23	<0.02	0.02	0.010	

NOTE: Conductivity in $\mu\text{mhos/cm}$.

TABLE 7 (CONTINUED)

SEPTEMBER 21, 1989

STATION QR06

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard	pH	Dissolved		Temp (°C)	Solids			Nitrogen		TP
								Oxygen (mg/l)	(%Sat)		Total	Fixed	TKN	NH ₃	NO ₃	
0.5	0.2	5	39	6.5	3.2	8	6.1	8.6	95	20.8	27	20	0.27	<0.02	<0.02	0.011
1			39				6.3	8.6	95	20.7						
2			39				6.3	8.6	95	20.6						
3			39				6.3	8.6	95	20.6						
4			39				6.3	8.6	95	20.5						
5			38				6.4	8.5	94	20.5						
6			38				6.4	8.5	94	20.5						
7			38				6.4	8.5	94	20.5						
8			38				6.4	8.5	94	20.4						
9			37				6.4	8.5	94	20.4						
10			37				6.4	8.5	94	20.4						
11	0.2	5	37	6.5	3.3	8	6.4	8.5	94	20.4	27	20	0.20	<0.02	<0.02	0.007
12			36				6.3	8.4	92	20.2						
13			37				6.0	7.9	79	15.7						
14			37				5.7	7.5	72	14.2						
15			36				5.6	7.5	71	13.1						
16			35				5.6	7.4	69	12.6						
17			35				5.5	7.3	67	12.1						
18	0.3	5	34	6.5	3.8	8	5.5	7.1	65	11.6	28	21	0.20	<0.02	<0.02	0.011
19			34				5.5	7.0	64	11.3						
20			34				5.4	6.8	61	11.0						
21			34				5.4	6.8	61	10.8						
24	0.7	7	33	6.5	4.2	8	5.4	6.4	57	10.6	27	21	0.26	0.04	0.03	0.008
25			34				5.4	5.5	49	10.4						

NOTE: Conductivity in $\mu\text{mhos/cm}$.

TABLE 7 (CONTINUED)

SEPTEMBER 21, 1989

STATION QR07

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard	pH	Dissolved		Temp (°C)	Solids			Nitrogen		TP
								Oxygen (mg/l)	(%Sat)		Total	Fixed	TKN	NH ₃	NO ₃	
0.5	0.3	5	39	6.5	3.7	7	5.9	8.6	95	20.7	28	20	0.23	<0.02	0.08	0.008
1			38				6.2	8.5	94	20.6						
2			39				6.2	8.5	94	20.5						
3			39				6.2	8.5	94	20.5						
4			38				6.2	8.4	92	20.4						
5			38				6.2	8.4	92	20.4						
6			38				6.2	8.4	92	20.4						
7			38				6.3	8.4	92	20.4						
8			37				6.3	8.4	92	20.4						
9			37				6.3	8.2	89	20.2						
10			37				6.2	8.1	88	20.1						
11	0.3	5	37	6.5	3.8	8	6.1	8.0	87	19.9	28	22	0.31	<0.02	<0.02	0.008
12			37				6.1	7.7	83	19.7						
13			37				5.7	6.4	67	17.3						
14			37				5.5	5.7	56	15.0						
15			37				5.5	5.5	53	13.9						
16	0.3	5	36	6.5	4.3	7	5.5	5.5	52	13.6	28	22	0.30	<0.02	0.03	0.010
17			36				5.4	5.5	52	13.0						
18			35				5.4	5.5	51	12.7						
19			35				5.4	5.4	50	12.4						
20			35				5.4	5.4	50	12.0						
21	0.3	5	34	6.5	4.3	8	5.4	5.3	49	11.8	28	22	0.23	0.03	0.03	0.011
21.5			34				5.3	5.3	48	11.6						

NOTE: Conductivity in $\mu\text{mhos/cm}$.

TABLE 7 (CONTINUED)

SEPTEMBER 21, 1989

STATION QR09

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard	pH	Dissolved		Temp (°C)	Solids			Nitrogen		TP
								Oxygen (mg/l)	(%Sat)		Total	Fixed	TKN	NH ₃	NO ₃	
0.5	0.3	5	40	6.5	3.8	9	6.0	8.4	93	21.1	31	22	0.25	<0.02	0.02	0.011
1		40					6.1	8.3	92	20.9						
2		39					6.1	8.4	92	20.7						
3		39					6.2	8.4	92	20.6						
4		39					6.2	8.4	92	20.5						
5		39					6.2	8.3	91	20.5						
6		39					6.1	8.2	90	20.5						
7		38					6.1	8.2	90	20.4						
8		38					6.1	8.1	89	20.4						
9		38					6.1	8.1	89	20.3						
10	0.3	5	38	6.5	3.8	8	6.1	8.1	88	20.1	31	22	0.30	<0.02	<0.02	0.014
11		37					6.1	8.1	88	20.0						
12		37					6.1	7.7	82	19.0						
13		37					5.7	6.5	67	16.8						
14		37					5.5	5.6	55	14.3						
15	0.3	5	36	7.0	3.9	8	5.4	5.2	50	13.6	31	20	0.22	0.02	0.03	0.016
15.4		36					5.3	4.9	46	13.0						

NOTE: Conductivity in $\mu\text{mhos/cm}$.

TABLE 7 (CONTINUED)

SEPTEMBER 21, 1989

STATION QR10

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard	pH	Dissolved		Temp (°C)	Solids		Nitrogen			TP
								Oxygen (mg/l)	(%Sat)		Total	Fixed	TKN	NH ₃	NO ₃	
0.5	0.5	7	42	7.5	4.2	8	6.0	8.3	93	21.6	33	22	0.30	<0.02	<0.02	0.012
1			42				6.1	8.2	92	21.7						
2			42				6.1	8.1	90	21.0						
3			42				6.1	8.0	89	20.8						
4			42				6.1	7.9	88	20.8						
5			42				6.1	7.9	87	20.6						
6			41				6.1	7.7	85	20.6						
7			41				6.0	7.7	85	20.6						
8			40				6.0	7.6	84	20.4						
9	0.5	7	40	7.5	4.2	8	5.9	7.3	80	20.3	32	20	0.32	<0.02	<0.02	0.016
10			40				5.9	7.3	80	20.2						
11			41				5.7	5.6	60	19.3						
12			45				5.4			16.6						
15	0.7	15		7.5	4.4	9	*6.0				36	23	0.15	<0.02	0.09	0.032

*Laboratory Analysis

NOTE: Conductivity in $\mu\text{mhos/cm}$.

TABLE 8
QUABBIN RESERVOIR WATER QUALITY AND SEDIMENT DATA REPORT
CHEMICAL AND NUTRIENT DATA (mg/l)

OCTOBER 25, 1989

STATION QR01

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard	pH	Dissolved		Temp (°C)	Solids		Nitrogen			TP
								Oxygen (mg/l)	(%Sat)		Total	Fixed	TKN	NH ₃	NO ₃	
0.5	0.3	5	41	7.0	3.6	6	6.4	9.2	87	13.0	31	22	0.22	<0.02	0.03	<0.005
3			40				6.3	9.1	86	13.0						
6			41				6.2	9.0	85	13.0						
9			41				6.2	9.1	86	13.0						
12			40				6.1	8.8	83	13.0						
15			40				6.1	8.9	84	13.0						
18			40				6.1	8.8	83	13.0						
21			40				6.1	8.8	83	12.9						
24			40				5.9	7.8	73	12.6						
25			40				5.7	7.3	67	12.2						
26			40				5.6	6.8	63	11.8						
27			40				5.5	6.7	61	11.5						
28			41				5.5	6.4	58	11.2						
29			41				5.5	6.4	58	10.8						
30			41				5.5	6.6	59	10.5						
31			41				5.4	6.4	57	10.2						
32			40				5.4	6.4	57	10.1						
35			40				5.4	5.7	50	9.5						
38			40				5.3	5.4	47	9.3						
39	0.3	5		6.5	3.8	7	*5.9				32	25	0.29	<0.02	0.04	<0.005

* Laboratory analysis
NOTE: Conductivity in μ mhos/cm.

TABLE 8 (CONTINUED)

OCTOBER 25, 1989

STATION QR02

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard	pH	Dissolved		Temp (°C)	Solids			Nitrogen		TP
								Oxygen (mg/l)	(%Sat)		Total	Fixed	TKN	NH ₃	NO ₃	
0.5	0.3	5	40	6.0	3.4	6	6.0	9.2	88	13.3	31	23	0.18	<0.02	0.03	<0.005
3		40					5.9	8.9	84	13.2						
6		39					5.9	8.9	84	13.1						
9		40					5.9	8.8	83	13.1						
12		40					5.9	8.7	82	13.1						
15		40					5.8	8.5	80	13.0						
18		40					5.8	8.3	78	12.9						
21		41					5.7	7.9	74	12.7						
22		41					5.6	7.7	72	12.6						
23		41					5.6	7.8	73	12.6						
24		41					5.5	7.2	67	12.3						
25		41					5.5	6.9	64	12.1						
26		40					5.4	6.5	59	11.5						
27		41					5.3	5.8	52	10.9						
30		41					5.3	5.6	50	10.3						
31.5	0.3	5	41	6.5	3.7	6	5.3	5.4	48	9.9	28	21	0.07	0.03	0.03	<0.005

NOTE: Conductivity in $\mu\text{mhos/cm}$.

TABLE 8 (CONTINUED)

OCTOBER 25, 1989

STATION QR03

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard	pH	Dissolved		Temp (°C)	Solids			Nitrogen		TP
								Oxygen (mg/l)	(%Sat)		Total	Fixed	TKN	NH ₃	NO ₃	
0.5	0.3	5	39	6.5	3.4	6	6.0	9.2	88	13.7	30	22	0.08	<0.02	0.02	<0.005
3		40					6.0	9.1	86	13.1						
6		40					6.0	9.1	86	13.1						
9		40					6.0	9.0	85	13.0						
12		40					5.9	9.0	85	12.9						
15		39					5.9	9.1	86	12.8						
18		38					5.9	9.0	83	12.2						
19		40					5.8	8.9	82	12.1						
20		40					5.7	8.9	82	12.0						
20.5	0.4	5	38	6.0	3.6	5	5.8	8.9	82	11.8	30	22	0.09	<0.02	0.02	<0.005
21		37					5.7	8.7	80	11.7						

NOTE: Conductivity in $\mu\text{mhos/cm}$.

TABLE 8 (CONTINUED)

OCTOBER 25, 1989

STATION QR04

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard	pH	Dissolved		Temp (°C)	Solids			Nitrogen		TP
								Oxygen (mg/l)	(%Sat)		Total	Fixed	TKN	NH ₃	NO ₃	
0.5	0.3	5	40	6.5	3.6	8	6.1	9.4	89	13.1	30	21	0.08	<0.02	0.03	0.006
3		40					6.0	9.3	88	13.1						
6		40					6.0	9.2	87	13.0						
9		40					6.0	9.3	88	13.0						
12		40					6.0	9.1	86	13.0						
15		40					6.0	9.0	85	13.0						
18		40					5.9	9.0	85	12.9						
21		39					5.9	8.5	79	12.7						
24		40					5.7	7.5	69	12.0						
25		41					5.6	7.3	67	11.8						
26		40					5.4	6.3	58	11.3						
27		40					5.4	6.2	56	11.0						
30		40					5.3	5.9	53	10.3						
33		40					5.3	5.4	47	9.6						
34	0.3	5		6.0	3.5	7	*6.0				29	21	0.10	0.03	0.05	0.006

* Laboratory analysis

NOTE: Conductivity in $\mu\text{mhos/cm}$.

TABLE 8 (CONTINUED)

OCTOBER 25, 1989

STATION QR06

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard (SU)	pH	Dissolved Oxygen (mg/l) (%Sat)	Temp (°C)	Solids		Nitrogen		TP
										Total	Fixed	TKN	NH ₃ NO ₃	
0.5	0.3	5	39	6.5	3.6	7	6.7	9.7	91	12.7	29	22	0.09 <0.02 <0.02	0.007
3			39				6.6	9.3	87	12.7				
6			38				6.4	9.3	87	12.7				
9			37				6.3	9.3	87	12.6				
12			36				6.3	9.2	86	12.6				
15			36				6.3	9.2	86	12.5				
18			35				6.2	9.2	86	12.5				
21			34				6.2	9.1	85	12.4				
24			33				6.1	8.9	83	12.3				
27	0.5	10	33	7.0	4.0	6	5.7	6.5	59	11.5	33	24	0.11 <0.02 0.03	0.007

STATION QR07

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard (SU)	pH	Dissolved Oxygen (mg/l) (%Sat)	Temp (°C)	Solids		Nitrogen		TP
										Total	Fixed	TKN	NH ₃ NO ₃	
0.5	0.3	5	38	7.0	4.0	6	6.0	9.6	90	12.5	30	23	0.06 <0.02 0.03	0.007
3			38				5.9	9.4	88	12.4				
6			37				5.9	9.4	88	12.4				
9			37				6.0	9.4	87	12.1				
12			36				6.0	9.4	87	12.0				
15			35				6.0	9.4	87	11.9				
18			34				6.0	9.4	87	11.8				
21			33				6.0	9.3	86	11.8				
21.5	0.4	5		7.0	4.0	7					32	23	0.12 <0.02 0.02	0.006
24			33				5.9	9.3	86	11.8				

NOTE: Conductivity in $\mu\text{mhos/cm}$.

TABLE 8 (CONTINUED)

OCTOBER 25, 1989

STATION QR09

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard	pH	Dissolved		Temp (°C)	Solids		Nitrogen			TP
								Oxygen (mg/l)	(%Sat)		Total	Fixed	TKN	NH ₃	NO ₃	
0.5	0.4	5	40	7.5	4.4	5	6.0	9.6	89	12.2	34	24	0.08	<0.02	0.07	0.007
3			40				6.0	9.4	87	11.9						
6			40				6.0	9.4	86	11.7						
9			39				6.0	9.3	85	11.7						
12			39				5.9	9.2	84	11.4						
13			38				5.9	9.1	83	11.3						
13.5	0.6	18		7.0	4.4	6					36	24	0.12	<0.02	0.03	0.008

STATION QR10

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard	pH	Dissolved		Temp (°C)	Solids		Nitrogen			TP
								Oxygen (mg/l)	(%Sat)		Total	Fixed	TKN	NH ₃	NO ₃	
0.5	0.6	17	41	8.0	4.6	5	6.0	9.5	88	12.0	37	26	0.10	0.02	0.05	0.010
3			41				6.0	9.4	86	11.5						
6			41				6.0	9.4	85	11.2						
9			40				5.9	9.3	84	11.0						
12			39				5.8	9.7	87	10.6						
13	0.7	37	38	7.5	4.3	4	5.6	9.7	87	10.4			0.13	<0.02	0.03	0.018
14			37				5.4	10.0	87	9.4						
15			37				5.4	10.1	88	9.3						
16			37				5.3	10.1	88	9.3						
16.5	0.7	55	37	8.0	3.6	3	*6.0	10.1	88	9.3	45	28	0.16	<0.02	0.02	0.015

* Laboratory analysis

NOTE: Conductivity in $\mu\text{mhos/cm}$.

TABLE 9

QUABBIN RESERVOIR WATER QUALITY AND SEDIMENT DATA REPORT

CHEMICAL AND NUTRIENT DATA (mg/l)

NOVEMBER 15, 1989

STATION QR01

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard (SU)	pH	Dissolved		Temp (°C)	Solids		Nitrogen			TP
								Oxygen (mg/l)	(%Sat)		Total	Fixed	TKN	NH ₃	NO ₃	
0.5	0.3	5	38	6.5	3.9	9	6.4	11.1	100	11.0	30	20	0.48	<0.02	0.03	0.005
3								11.0	99	11.0						
6								11.2	101	11.0						
9								11.0	99	11.0						
12								11.0	99	11.0						
15								11.0	99	11.0						
18								10.8	98	11.0						
21								10.9	99	11.0						
24								10.8	98	11.0						
27								10.6	96	11.0						
30								10.2	92	11.0						
33								9.7	88	10.8						
36								6.5	57	9.6						
38	0.4	5	40	6.5	4.1	8	6.1	6.0	52	9.2	30	20	0.49	0.03	0.07	<0.005
39																

NOTE: Conductivity in $\mu\text{mhos/cm}$.

TABLE 9 (CONTINUED)

NOVEMBER 15, 1989

STATION QR06

Depth (m)	Turb (NTU)	Color (CU)	Cond	Cl	Alk	Hard (SU)	pH	Dissolved			Temp (°C)	Solids		Nitrogen			TP
								Oxygen (mg/l)	(%Sat)	Total		Fixed	TKN	NH ₃	NO ₃		
0.5	0.3	5	38	6.5	3.4	8	6.4	13.2	119	11.0	30	18	0.21	<0.02	0.05	<0.005	
3								13.2	119	11.0							
6								13.0	118	11.0							
9								12.8	116	11.0							
12								12.6	114	11.0							
15								12.6	114	11.0							
18								12.4	112	11.0							
21								12.6	114	11.0							
24								12.4	112	11.0							
27	0.3	5	38	6.5	3.9	8	6.4	12.4	112	11.0	30	18	0.35	<0.02	0.04	<0.005	
27.5																	

NOTE: Conductivity in $\mu\text{mhos/cm}$.

TABLE 10

QUABBIN RESERVOIR WATER QUALITY AND SEDIMENT DATA REPORT

TOTAL METALS (mg/l)

APRIL - NOVEMBER 1989

STATIONS 1 - 5

STATION	DATE	DEPTH	Al	As	Cd	Ca	Cu	Fe	Pb	Hg	Ni	Zn	Cr	Ag
QR01	4/19/89	33.5	<0.05	<0.002	<0.001	2.3	<0.002	0.026	0.003	0.0003	<0.002	0.005		
	5/18/89	35.0	<0.05	<0.001	<0.001	5.1	<0.002	0.013	<0.002	0.0002	<0.003	0.007		
	6/14/89	35.0	<0.05	<0.002	<0.001	2.6	0.004	0.030	0.002	0.0003	<0.002	0.009	0.002	
	7/19/89	35.0	<0.05	<0.002	<0.001	3.6	0.009	0.090	<0.002	0.0010	<0.003	0.009		<0.001
	8/16/89	36.0	<0.05	<0.002	<0.001	2.4	0.003	<0.003	<0.002	0.0002	<0.003	<0.005		
	9/21/89	39.0	<0.05	<0.002	<0.001		0.005	0.130	<0.002	<0.0002	0.005			
	10/25/89	39.0	<0.05	<0.001	<0.001	2.3	<0.002	0.080	<0.002	<0.0002	<0.003	0.005	<0.002	
	11/15/89	38.0	<0.05	<0.001	<0.001	2.3	0.003	0.060	<0.002	<0.0002	<0.005	<0.005	<0.002	
	4/19/89	30.5	<0.05	<0.002	<0.001	2.3	<0.002	0.021	<0.002	0.0002	<0.002	<0.002		
	5/18/89	30.0	<0.05	<0.001	<0.001	2.8	<0.002	0.030	<0.002	0.0003	<0.003	0.004		
QR02	6/14/89	35.0	<0.05	<0.002	<0.001	2.7	<0.002	<0.001	0.002	0.0002	<0.002	0.006	0.002	
	7/19/89	30.0	<0.05	<0.002	<0.001	2.9	<0.002	0.040	0.002	0.0006	<0.003	0.039		<0.001
	8/16/89	30.5	<0.05	<0.002	<0.001	2.3	<0.002	<0.003	<0.002	<0.0002	<0.003	<0.005		
	9/21/89	34.5	<0.05	<0.002	<0.001	2.6	0.004	0.230	<0.002	<0.0002	0.006	0.009		
	10/25/89	31.5	<0.05	<0.001	<0.001	2.3	<0.002	0.070	<0.002	<0.0002	<0.003	<0.005	<0.002	
	4/19/89	18.3	<0.05	<0.002	<0.001	2.5	<0.002	0.054	<0.002	0.0002	<0.002	0.024		
	5/18/89	20.0	<0.05	<0.001	<0.001	4.9	<0.002	0.011	<0.002	0.0002	<0.003	0.007		
	6/14/89	21.0	<0.05	<0.002	<0.001	2.4	<0.002	<0.001	0.003	<0.0002	0.019	0.006	0.003	<0.001
QR03	7/19/89	20.5	<0.05	<0.002	<0.001	4.0	<0.002	0.080	<0.002	0.0006	0.006	0.018		
	8/16/89	20.5	<0.05	<0.002	<0.001	2.3	<0.002	0.050	<0.002	<0.0002	0.006	0.008		
	9/21/89	20.0	<0.05	<0.002	<0.001	2.4	0.002	0.230	<0.002	0.0014	<0.003	<0.005		
	10/25/89	20.5	<0.05	<0.001	<0.001	1.3	<0.002	0.050	<0.002	<0.0002	<0.003	<0.005	<0.002	
	4/19/89	27.4	<0.05	<0.002	<0.001	2.5	<0.002	0.022	<0.002	<0.0002	<0.002	0.006		
	5/18/89	34.0	<0.05	<0.001	<0.001	3.7	<0.002	0.040	<0.002	0.0002	<0.003	0.009		
QR04	6/14/89	25.0	<0.05	<0.002	<0.001	2.6	0.003	0.060	<0.002	<0.0002	0.003	0.006	0.003	<0.001
	7/19/89	29.0	<0.05	<0.002	<0.001	3.1	0.003	0.080	<0.002	0.0007	0.005	<0.005		
	8/16/89	32.0	<0.05	<0.002	<0.001	2.2	<0.002	0.030	<0.002	<0.0002	0.004	<0.005		
	9/21/89	28.0	<0.05	<0.002	<0.001	2.3	0.005	0.090	<0.002	<0.0002	<0.003	0.014		
	10/25/89	34.0	<0.05	<0.001	<0.001	1.8	0.002	0.100	<0.002	<0.0002	0.010	0.015	<0.002	
	4/19/89	33.5	<0.05	<0.002	<0.001	2.2	<0.002	0.037	<0.002	<0.0002	<0.002	0.002		

NOTE: Depths expressed in meters.

TABLE 10 (CONTINUED)

TOTAL METALS (mg/l)

APRIL - NOVEMBER 1989

STATIONS 6 - 10

STATION	DATE	DEPTH	Al	As	Cd	Ca	Cu	Fe	Pb	Hg	Ni	Zn	Cr	Ag
QR06	4/19/89	31.0	<0.05	0.002	<0.001	2.2	<0.002	0.048	<0.002	0.0002	<0.002	0.005		
	5/18/89	25.9	<0.05	<0.001	<0.001	4.1	<0.002	0.045	<0.002	0.0002	<0.003	0.009		
	6/14/89	26.0	<0.05	<0.002	<0.001	2.5	<0.002	0.060	<0.002	<0.0002	<0.002	0.009	0.002	
	7/19/89	24.0	<0.05	<0.002	<0.001	3.0	0.005	0.080	0.003	0.0004	0.007	0.012		<0.001
	8/16/89	23.0	<0.05	<0.002	<0.001	2.2	<0.002	0.085	<0.002	<0.0002	<0.003	<0.005		
	9/21/89	24.0	<0.05	<0.002	<0.001	3.0	0.003	0.240	<0.002	<0.0002	<0.003	0.007		
	10/25/89	27.0	<0.05	<0.001	<0.001	1.7	0.002	0.200	<0.002	<0.0002	<0.003	<0.005	<0.002	
	11/15/89	26.5	<0.05	<0.001	<0.001	2.2	<0.002	0.040	<0.002	<0.0002	<0.005	<0.005	<0.002	
QR07	5/18/89	20.0	<0.05	<0.001	<0.001	3.2	<0.002	0.010	<0.002	<0.0002	<0.003	0.003		
	6/14/89	22.0	<0.05	<0.002	<0.001	2.6	<0.002	<0.001	<0.002	<0.0002	<0.002	0.008	0.002	
	7/19/89	19.7	<0.05	0.002	<0.001	2.6	<0.002	0.050	<0.002	0.0004	<0.003	0.013		<0.001
	8/16/89	20.0	<0.05	<0.002	<0.001	3.2	0.003	0.080	<0.002	<0.0002	<0.003	0.024		
	9/21/89	20.5	<0.05	<0.002	<0.001	2.9	0.002	0.140	<0.002	0.0002	<0.003	<0.005		
	10/25/89	21.5	<0.05	<0.001	<0.001	1.9	<0.002	0.080	<0.002	<0.0002	0.018	<0.005	<0.002	
QR08	4/19/89	13.0	<0.05	<0.002	<0.001	2.5	0.002	0.060	<0.002	<0.0002	0.003	0.029		
QR09	5/18/89	13.0	<0.05	<0.001	<0.001	2.5	0.003	0.030	<0.002	0.0003	<0.003	0.008		
	6/14/89	17.0	<0.05	<0.002	<0.001	2.6	0.002	0.100	0.003	0.0002	0.003	0.004	0.002	
	7/19/89	12.0	<0.05	<0.002	<0.001	2.7	<0.002	0.050	<0.002	0.0005	<0.003	<0.005		<0.001
	8/16/89	13.0	<0.05	<0.002	<0.001	2.3	0.007	0.120	<0.002	<0.0002	0.006	<0.005		
	9/21/89	15.0	<0.05	<0.002	<0.001	3.0	<0.002	0.080	<0.002	<0.0002	<0.003	<0.005		
	10/25/89	13.5	<0.05	<0.001	<0.001	1.7	<0.002	0.160	<0.002	<0.0002	<0.005	<0.005	<0.002	
QR10	4/19/89	10.0	<0.05	<0.002	<0.001	2.6	<0.002	0.130	0.003	<0.0002	<0.002	0.092		
	5/18/89	15.2	<0.05	<0.001	<0.001	6.5	<0.002	0.150	<0.002	<0.0002	<0.003	0.006		
	6/14/89	17.0	<0.05	<0.002	<0.001	2.2	<0.002	0.120	<0.002	<0.0002	<0.002	0.007	0.002	
	7/19/89	15.0	<0.05	<0.002	<0.001	2.7	<0.002	0.090	0.003	0.0008	0.008	0.007		<0.001
	8/16/89	14.0	<0.05	<0.002	<0.001	1.7	<0.002	0.190	<0.002	<0.0002	<0.003	<0.005		
	9/21/89	15.0	<0.05	<0.002	<0.001	2.9	0.002	0.240	<0.002	<0.0002	<0.003	<0.005		
	10/25/89	16.5	0.10	<0.001	<0.001	0.8	<0.002	0.240	<0.002	<0.0002	0.011	0.005	<0.002	

NOTE: Depths expressed in meters.

TABLE 11

QUABBIN RESERVOIR WATER QUALITY AND SEDIMENT DATA REPORT

PHYTOPLANKTON ENUMERATION (ASU/ml) AND CHLOROPHYLL a DATA (mg/m³)

APRIL 19, 1989

ORGANISM	STATION DEPTH	QR01 <u>comp</u>	QR02 <u>comp</u>	QR03 <u>comp</u>	QR04 <u>comp</u>	QR05 <u>comp</u>	QR06 <u>comp</u>	QR08 <u>comp</u>	QR10 <u>comp</u>
<hr/>									
Bacillariophyceae (Diatoms)									
<u>Rhizosolenia</u>		17.0	18.3	4.7	21.2	45.0	63.2	30.0	0.0
<u>Asterionella</u>		73.0	93.0	89.6	74.9	41.1	37.6	40.9	28.5
<u>Tabellaria</u>		11.3	26.0	5.1	11.3	24.5	16.3	43.9	34.6
Other Centric Diatoms		9.1	12.6	5.4	17.0	20.1	22.2	17.9	2.6
Other Pennate Diatoms		3.0	1.8	1.9	2.6	3.0	3.3	4.2	15.2
TOTAL		113.4	151.7	106.7	127.0	133.7	142.6	136.9	80.9
Cyanophyceae (Blue-greens)									
<u>Anabaena</u>		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cocoid blue-greens		0.0	31.5	51.3	26.3	0.5	2.9	0.7	0.0
Other filamentous		0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.0
TOTAL		0.0	31.5	51.3	26.3	0.5	2.9	1.0	0.0
Chlorophyceae (Greens)									
Cocoid greens		7.6	3.0	3.5	3.3	0.5	2.7	12.1	0.7
Desmids		9.2	1.7	4.8	2.5	1.7	6.1	0.7	0.8
Filamentous		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Flagellates		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL		16.8	4.7	8.3	5.8	2.2	8.8	12.8	1.5
Chrysophyceae (Golden-browns)									
<u>Synura</u>		2.3	2.3	10.1	5.2	4.7	0.0	7.7	0.6
<u>Dinobryon</u>		5.8	11.3	13.4	16.3	15.7	32.1	10.4	3.5
<u>Chrysosphaerella</u>		1.7	0.0	2.9	5.4	7.8	7.0	2.8	0.0
<u>Mallomonas</u>		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<u>Uroglenopsis</u>		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL		9.8	13.6	26.4	26.9	28.2	39.1	20.9	4.1
Dinophyceae (Dinoflagellates)									
TOTAL		6.8	12.2	18.0	8.1	23.8	7.4	11.6	5.6
<hr/>									
TOTAL ALGAE (ASU/ML)		146.8	213.7	210.7	194.1	188.4	200.8	183.2	92.1
CHLOROPHYLL <u>a</u> (mg/m ³)		2.5	2.9	3.2	1.9	1.6	1.6	2.0	1.6
<hr/>									

TABLE 12

QUABBIN RESERVOIR WATER QUALITY AND SEDIMENT DATA REPORT

PHYTOPLANKTON ENUMERATION (ASU/ml) AND CHLOROPHYLL a DATA (mg/m³)

MAY 18, 1989

ORGANISM	STATION DEPTH	QR01 <u>comp</u>	QR02 <u>comp</u>	QR03 <u>comp</u>	QR04 <u>comp</u>	QR06 <u>comp</u>	QR07 <u>comp</u>	QR09 <u>comp</u>	QR10 <u>comp</u>
<hr/>									
Bacillariophyceae (Diatoms)									
<u>Rhizosolenia</u>		57.4	47.1	39.4	50.9	85.4	67.2	27.5	7.8
<u>Asterionella</u>		48.8	54.6	47.6	32.4	47.4	65.3	37.1	18.2
<u>Tabellaria</u>		6.6	3.9	1.9	10.5	15.2	13.2	14.4	16.8
Other Centric Diatoms		5.4	3.5	4.7	4.9	4.2	6.8	5.6	3.6
Other Pennate Diatoms		1.2	1.2	0.9	0.7	2.8	1.2	1.6	7.6
TOTAL		119.0	110.3	94.5	99.4	155.0	153.7	86.2	54.0
Cyanophyceae (Blue-greens)									
<u>Anabaena</u>		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Coccoid blue-greens		12.1	2.1	4.6	1.2	7.0	21.6	6.6	1.4
Other filamentous		0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.4
TOTAL		12.1	2.1	4.6	1.2	7.0	21.6	6.6	2.8
Chlorophyceae (Greens)									
Coccoid greens		6.4	3.8	5.9	2.2	1.4	13.0	5.2	0.0
Desmids		6.6	5.2	7.6	4.0	6.0	3.2	1.9	4.0
Filamentous		0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0
Flagellates		0.0	0.0	0.0	0.0	0.0	1.7	0.6	0.0
TOTAL		13.0	9.0	13.5	6.2	7.4	17.9	8.3	4.0
Chrysophyceae (Golden-browns)									
<u>Synura</u>		0.0	4.7	6.4	0.0	0.0	0.6	2.3	0.0
<u>Dinobryon</u>		1.2	7.6	5.2	5.2	0.0	37.3	0.6	4.2
<u>Chrysosphaerella</u>		5.8	9.9	0.0	3.5	2.3	25.7	3.5	0.0
<u>Mallomonas</u>		0.0	1.2	0.6	0.0	0.0	0.0	0.0	1.4
<u>Uroglenopsis</u>		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL		7.0	23.4	12.2	8.7	2.3	63.6	6.4	5.6
Dinophyceae (Dinoflagellates)									
TOTAL		3.5	5.9	4.4	0.8	3.5	2.7	3.1	0.0
TOTAL ALGAE (ASU/ML)		157.3	150.7	129.2	116.3	175.2	260.1	110.6	66.4
CHLOROPHYLL <u>a</u> (mg/m ³)		1.1	1.1	1.0	0.8	1.4	1.7	1.6	2.1

TABLE 13

QUABBIN RESERVOIR WATER QUALITY AND SEDIMENT DATA REPORT

PHYTOPLANKTON ENUMERATION (ASU/ml) AND CHLOROPHYLL *a* DATA (mg/m³)

JUNE 14, 1989

ORGANISM	STATION DEPTH	QR01 0 m	QR01 6 m	QR01 12 m	QR06 0 m	QR06 4 m	QR06 9 m	QR07 0 m	QR07 4 m	QR07 8 m	QR10 0 m
Bacillariophyceae (Diatoms)											
<u>Rhizosolenia</u>		0.0	0.0	0.0	0.0	0.0	5.9	4.0	4.2	0.0	0.0
<u>Asterionella</u>		16.1	11.5	1.2	10.9	6.7	5.3	13.0	17.5	7.2	5.1
<u>Tabellaria</u>		0.0	0.0	0.0	5.1	0.0	0.0	8.9	0.0	0.0	1.6
Other Centric Diatoms		24.5	37.2	10.7	52.1	84.8	26.6	42.2	85.1	38.7	7.0
Other Pennate Diatoms		2.4	0.6	0.5	2.2	0.8	0.3	0.9	1.4	1.4	0.5
TOTAL		43.0	49.3	12.4	70.3	92.3	38.1	69	108.2	47.3	14.2
Cyanophyceae (Blue-greens)											
<u>Anabaena</u>		47.9	22.7	2.1	42.0	42.0	8.1	42.9	58.5	15.1	205.3
Cocoid blue-greens		5.4	8.9	4.3	5.9	3.1	8.4	6.4	8.5	1.8	19.2
Other filamentous		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL		53.3	31.6	6.4	47.9	45.1	16.5	49.3	67.0	16.9	224.5
Chlorophyceae (Greens)											
Cocoid greens		4.0	3.0	0.6	5.9	7.7	3.5	7.8	9.6	2.9	5.1
Desmids		1.5	1.8	4.1	5.6	4.9	2.1	2.7	1.5	5.2	2.3
Filamentous		0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Flagellates		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2	0.0
TOTAL		6.3	4.8	4.7	11.5	12.6	5.6	10.5	11.1	9.3	7.4
Chrysophyceae (Golden-browns)											
<u>Synura</u>		0.0	0.0	1.7	0.0	0.7	1.6	0.0	1.7	4.7	0.0
<u>Dinobryon</u>		1.5	2.8	21.0	56.7	60.9	46.2	10.5	125.1	226.6	34.9
<u>Chrysosphaerella</u>		0.0	0.0	4.8	8.4	9.1	16.8	5.2	39.4	26.2	0.0
<u>Mallomonas</u>		1.5	0.0	0.6	0.4	0.7	0.0	0.0	3.5	1.2	0.0
<u>Uroglenopsis</u>		18.2	11.2	0.0	14.0	320.6	8.4	0.0	308.0	0.0	21.0
TOTAL		21.2	14.0	28.1	79.5	392	73	15.7	477.7	258.7	55.9
Dinophyceae (Dinoflagellates)											
TOTAL		3.0	6.0	9.7	2.1	5.6	5.6	1.2	6.1	10.5	0.6
TOTAL ALGAE (ASU/ML)		126.8	105.7	61.3	211.3	549.7	139.5	148	670.1	342.7	302.6
CHLOROPHYLL <i>a</i> (mg/m ³)		-----5.5----- (composite)			-----9.8----- (composite)			-----9.87----- (composite)			

TABLE 14

QUABBIN RESERVOIR WATER QUALITY AND SEDIMENT DATA REPORT

PHYTOPLANKTON ENUMERATION (ASU/ml) AND CHLOROPHYLL *a* DATA (mg/m³)

AUGUST 16, 1989

ORGANISM	STATION DEPTH	QR01 8 m	QR06 0 m	QR06 4 m	QR06 8 m	QR06 13 m
<hr/>						
Bacillariophyceae (Diatoms)						
<u>Rhizosolenia</u>		0.0	0.0	0.0	0.0	0.0
<u>Asterionella</u>		0.0	0.0	0.0	0.9	0.0
<u>Tabellaria</u>		0.0	0.0	0.4	0.0	0.5
Other Centric Diatoms						
Other Pennate Diatoms		0.0	0.0	0.0	0.2	0.0
TOTAL		0.0	0.0	0.4	1.1	0.5
<hr/>						
Cyanophyceae (Blue-greens)						
<u>Anabaena</u>		0.0	0.0	0.0	0.0	0.0
Coccoid blue-greens		4.7	29.7	36.0	20.2	1.4
Other filamentous		0.0	0.0	1.2	0.0	0.0
TOTAL		4.7	29.7	37.2	20.2	1.4
<hr/>						
Chlorophyceae (Greens)						
Coccoid greens		0.0	3.2	1.8	7.0	4.9
Desmids		0.0	0.5	0.0	0.0	2.1
Filamentous		0.0	0.0	0.0	0.2	0.7
Flagellates		0.0	0.0	0.0	0.0	0.0
TOTAL		0.0	3.7	1.8	7.2	7.7
<hr/>						
Chrysophyceae (Golden-browns)						
<u>Synura</u>		0.0	0.0	0.0	0.0	3.5
<u>Dinobryon</u>		8.7	0.0	0.6	0.0	186.9
<u>Chrysosphaerella</u>		7.6	0.0	0.0	0.0	28.0
<u>Mallomonas</u>		0.0	0.0	0.0	0.0	0.9
<u>Uroglenopsis</u>		0.0	0.0	0.0	0.0	5.6
TOTAL		16.3	0.0	0.6	0.0	224.9
<hr/>						
Dinophyceae (Dinoflagellates)						
TOTAL		0.0	3.5	7.0	3.4	12.6
<hr/>						
TOTAL ALGAE (ASU/ml)		21.6	36.9	48.2	31.9	249.9
<hr/>						
CHLOROPHYLL <i>a</i> (mg/m ³)		5.6	-----5.7-----			
			(composite)			

TABLE 15

QUABBIN RESERVOIR WATER QUALITY AND SEDIMENT DATA REPORT

PHYTOPLANKTON ENUMERATION (ASU/ml) AND CHLOROPHYLL *a* DATA (mg/m³)

SEPTEMBER 21, 1989

ORGANISM	STATION DEPTH	QR02 12.5 m	QR06 0 m	QR06 6 m	QR06 12 m
<hr/>					
Bacillariophyceae (Diatoms)					
<u>Rhizosolenia</u>		0.0	0.0	0.0	0.0
<u>Asterionella</u>		0.0	5.1	6.7	1.2
<u>Tabellaria</u>		0.0	5.1	10.7	6.2
Other Centric Diatoms		0.0	0.2	0.0	0.7
Other Pennate Diatoms		0.0	0.2	0.3	0.0
TOTAL		0.0	10.6	17.7	8.1
Cyanophyceae (Blue-greens)					
<u>Anabaena</u>		0.0	14.0	1.7	0.0
Coccoid blue-greens		79.3	71.7	95.2	60.9
Other filamentous		0.0	1.9	0.0	0.0
TOTAL		79.3	87.6	96.9	60.9
Chlorophyceae (Greens)					
Coccoid greens		1.7	7.8	3.9	5.1
Desmids		0.0	0.6	0.0	0.0
Filamentous		0.0	0.0	0.0	0.0
Flagellates		0.0	0.0	0.0	0.0
TOTAL		1.7	8.4	3.9	5.1
Chrysophyceae (Golden-browns)					
<u>Synura</u>		2.3	0.0	0.0	0.0
<u>Dinobryon</u>		3.5	0.0	1.4	0.0
<u>Chrysosphaerella</u>		11.1	0.0	0.0	1.6
<u>Mallomonas</u>		1.4	0.0	0.9	0.4
<u>Uroglenopsis</u>					
TOTAL		18.3	0.0	2.3	2.0
Dinophyceae (Dinoflagellates)					
TOTAL		3.7	0.0	4.8	1.2
<hr/>					
TOTAL ALGAE (ASU/ml)		102.0	106.6	125.3	77.3
CHLOROPHYLL <i>a</i> (mg/m ³)				-----3.1-----	
				(composite)	

TABLE 16

QUABBIN RESERVOIR WATER QUALITY AND SEDIMENT DATA REPORT

PHYTOPLANKTON ENUMERATION (ASU/ml) AND CHLOROPHYLL *a* DATA (mg/m³)

OCTOBER 25, 1989

ORGANISM	STATION DEPTH	QR06 0 m	QR06 3 m	QR06 6 m
<hr/>				
Bacillariophyceae (Diatoms)				
<u>Rhizosolenia</u>		0.9	0.0	0.0
<u>Asterionella</u>		23.3	30.8	29.4
<u>Tabellaria</u>		31.1	16.3	21.9
Other Centric Diatoms		1.2	0.6	2.8
Other Pennate Diatoms		0.5	1.1	0.3
TOTAL		57.0	48.8	54.4
<hr/>				
Cyanophyceae (Blue-greens)				
<u>Anabaena</u>		19.6	18.2	5.0
Coccoid blue-greens		34.7	23.6	38.3
Other filamentous				
TOTAL		54.3	41.8	43.3
<hr/>				
Chlorophyceae (Greens)				
Coccoid greens		6.4	2.5	3.5
Desmids		2.9	4.2	2.1
Filamentous		0.0	0.0	0.0
Flagellates		0.0	0.0	0.0
TOTAL		9.3	6.7	5.6
<hr/>				
Chrysophyceae (Golden-browns)				
<u>Synura</u>				
<u>Dinobryon</u>		0.0	0.0	7.0
<u>Chrysosphaerella</u>		0.0	0.0	2.8
<u>Mallomonas</u>		1.2	1.9	0.0
<u>Uroglenopsis</u>				
TOTAL		1.2	1.9	9.8
<hr/>				
Dinophyceae (Dinoflagellates)				
TOTAL		0.6	0.0	6.3
<hr/>				
TOTAL ALGAE (ASU/ml)		123.5	99.9	119.4
<hr/>				
CHLOROPHYLL <i>a</i> (mg/m ³)		-----2.7-----		
		(composite)		

TABLE 17

QUABBIN RESERVOIR WATER QUALITY AND SEDIMENT DATA REPORT

PHYTOPLANKTON ENUMERATION (ASU/ml) AND CHLOROPHYLL a DATA (mg/m³)

NOVEMBER 15, 1989

ORGANISM	STATION DEPTH	QR01 comp	QR06 0 m	QR06 6 m	QR06 12 m
<hr/>					
Bacillariophyceae (Diatoms)					
<u>Rhizosolenia</u>		0.0	0.0	0.7	0.0
<u>Asterionella</u>		32.6	60.8	69.9	64.3
<u>Tabellaria</u>		26.4	35.7	47.4	82.3
Other Centric diatoms		0.5	11.4	10.9	12.6
Other Pennate Diatoms		0.0	0.7	0.5	0.2
TOTAL		59.5	108.6	129.4	159.4
<hr/>					
Cyanophyceae (Blue-greens)					
<u>Anabaena</u>		0.0	3.5	9.8	1.6
Coccoid blue-greens		13.6	24.8	16.5	17.3
Other filamentous		0.0	0.0	0.2	0.0
TOTAL		13.6	28.3	26.5	18.9
<hr/>					
Chlorophyceae (Greens)					
Coccoid greens		2.5	5.0	5.9	11.9
Desmids		0.8	4.3	4.1	2.3
Filamentous					
Flagellates					
TOTAL		3.3	9.3	10.0	14.2
<hr/>					
Chrysophyceae (Golden-browns)					
<u>Synura</u>		2.7	4.1	1.2	0.0
<u>Dinobryon</u>		2.3	6.4	1.0	7.0
<u>Chrysosphaerella</u>		8.2	10.5	7.0	9.3
<u>Mallomonas</u>		0.4	2.6	0.8	1.0
<u>Uroglenopsis</u>		0.0	9.3	0.0	1.2
TOTAL		13.6	32.9	10.0	18.5
<hr/>					
Dinophyceae (Dinoflagellates)					
TOTAL		1.7	6.7	4.1	2.9
<hr/>					
TOTAL ALGAE (ASU/ml)		91.7	185.8	181.2	215.6
CHLOROPHYLL <u>a</u> (mg/m ³)		3.4	-----	4.6-----	
				(composite)	

TABLE 18

QUABBIN RESERVOIR WATER QUALITY AND SEDIMENT REPORT

CHLOROPHYLL a (mg/m³)

APRIL - NOVEMBER 1989

DATE	QR01	QR02	QR03	QR04	QR05	QR06	QR07	QR08	QR09	QR10
4/19/89	2.5	2.9	3.2	1.9	1.6	1.6	--	2.0	--	1.6
5/18/89	1.1	1.1	1.0	0.8	--	1.4	1.7	--	1.6	2.1
6/14/89	5.5	--	--	--	--	9.8	9.8	--	--	--
7/19/89	1.6	4.4	1.8	2.8	--	1.6	2.2	--	0.9	1.9
8/16/89	5.6	9.0	2.2	12.2	--	5.7	6.9	--	3.3	3.6
9/21/89	2.8	4.4	5.0	2.8	--	3.1	3.1	--	3.6	4.4
10/25/89	2.5	2.3	2.4	2.7	--	2.7	3.1	--	3.5	3.4
11/15/89	3.4	--	--	--	--	4.6	--	--	--	--

TABLE 19

QUABBIN RESERVOIR WATER QUALITY AND SEDIMENT DATA REPORT

SECCHI DISC (meters)

APRIL - NOVEMBER 1989

DATE	QR01	QR02	QR03	QR04	QR05	QR06	QR07	QR08	QR09	QR10
4/19/89	8.3	9.5	5.5	6.4	6.4	9.5	--	6.0	--	4.5
5/18/89	8.0	9.0	9.0	8.0	--	10.4	7.3	--	4.9	2.7
6/14/89	8.3	8.0	6.4	7.6	--	8.9	5.8	--	3.8	2.6
7/19/89	8.6	9.6	9.1	9.8	--	9.8	9.4	--	8.0	4.7
8/16/89	9.8	9.7	10.2	9.7	--	10.0	8.5	--	6.0	4.5
9/21/89	10.1	9.3	9.0	9.0	--	9.1	8.2	--	7.1	4.6
10/25/89	9.0	10.0	8.8	8.3	--	7.0	8.0	--	5.1	4.0
11/15/89	8.5	--	--	--	--	8.0	--	--	--	--

TABLE 20

QUABBIN RESERVOIR WATER QUALITY AND SEDIMENT DATA REPORT

BACTERIA

APRIL 19, 1989

	QR01	QR02	QR03	QR04	QR05	QR06	QR07	QR08	QR09	QR10
Heterotrophic										
48 Hours @ 20°C	1	1	18	1	2	0	--	11	--	42
24 Hours @ 35°C	0	0	0	0	0	0	--	1	--	13
Total Coliform	0	0	0	0	0	0	--	0	--	1

MAY 18, 1989

	QR01	QR02	QR03	QR04	QR05	QR06	QR07	QR08	QR09	QR10
Heterotrophic										
48 Hours @ 20°C	0	0	13	0	--	3	0	--	2	6
24 Hours @ 35°C	0	0	2	0	--	0	0	--	2	0
Total Coliform	0	0	0	2	--	0	0	--	0	7

JUNE 14, 1989

	QR01	QR02	QR03	QR04	QR05	QR06	QR07	QR08	QR09	QR10
Heterotrophic										
48 Hours @ 20°C	9	3	17	28	--	17	16	--	31	23
24 Hours @ 35°C	0	0	0	1	--	3	0	--	7	0
Total Coliform	0	0	0	1	--	2	0	--	2	1

NOTE: Total heterotrophic bacteria expressed as CFU/ml. Total coliform expressed as coliforms/100ml.

TABLE 20 (CONTINUED)

BACTERIA

JULY 19, 1989

	QR01	QR02	QR03	QR04	QR05	QR06	QR07	QR08	QR09	QR10
Heterotrophic										
48 Hours @ 20°C	16	27	15	18	--	19	19	--	27	37
24 Hours @ 35°C	2	11	5	8	--	10	12	--	13	22
Total Coliform	0	0	0	1	--	1	0	--	0	1

AUGUST 16, 1989

	QR01	QR02	QR03	QR04	QR05	QR06	QR07	QR08	QR09	QR10
Heterotrophic										
48 Hours @ 20°C	75	28	55	43	--	40	34	--	28	27
24 Hours @ 35°C	50	20	26	20	--	12	22	--	23	19
Total Coliform	3	0	0	0	--	0	0	--	3	0

SEPTEMBER 21, 1989

	QR01	QR02	QR03	QR04	QR05	QR06	QR07	QR08	QR09	QR10
Heterotrophic										
48 Hours @ 20°C	29	10	24	25	--	11	26	--	27	13
24 Hours @ 35°C	13	4	9	7	--	5	2	--	4	6
Total Coliform	2	0	1	0	--	0	1	--	0	0

NOTE: Total heterotrophic bacteria expressed as CFU/ml. Total coliform expressed as coliforms/100ml.

TABLE 20 (CONTINUED)

BACTERIA

OCTOBER 25, 1989

	QR01	QR02	QR03	QR04	QR05	QR06	QR07	QR08	QR09	QR10
Heterotrophic										
48 Hours @ 20°C	38	50	47	42	--	27	22	--	6	31
24 Hours @ 35°C	5	6	7	1	--	2	5	--	0	3
Total Coliform	3	0	0	1	--	1	1	--	0	1

NOVEMBER 15, 1989

	QR01	QR02	QR03	QR04	QR05	QR06	QR07	QR08	QR09	QR10
Heterotrophic										
48 Hours @ 20°C	12	--	--	--	--	7	--	--	--	--
24 Hours @ 35°C	3	--	--	--	--	1	--	--	--	--
Total Coliform	2	--	--	--	--	1	--	--	--	--

NOTE: Total heterotrophic bacteria expressed as CFU/ml. Total coliform expressed as coliforms/100ml.

TABLE 21

QUABBIN RESERVOIR WATER QUALITY AND SEDIMENT DATA REPORT

SEDIMENT DATA (mg/kg dry weight)

OCTOBER 1989

STATIONS IN WEST BASIN

QS-A WEST BRANCH SWIFT RIVER

SAMPLE NO.	%TVS	TKN	TP	Al	Fe	As	Cd	Cr	Cu	Hg	Mn	Ni	Pb	V	Zn
1	15.4	3640	600	10250	13000	1.2	<1.0	3.5	10	0.2	270	8.5	38	22	58
2	26.5	3560	600	9400	13000	1.0	<1.0	4.5	20	0.3	270	18	55	20	73

QS-B ASH POND

SAMPLE NO.	%TVS	TKN	TP	Al	Fe	As	Cd	Cr	Cu	Hg	Mn	Ni	Pb	V	Zn
1	29	3640	900	10650	3000	<0.5	<1.0	<1.5	11	0.2	160	9	33	2	63
2	8.8	1850	580	7400	9000	1.7	<1.0	1.5	8.5	0.1	315	13	21	14	38

QS-C CADWELL CREEK

SAMPLE NO.	%TVS	TKN	TP	Al	Fe	As	Cd	Cr	Cu	Hg	Mn	Ni	Pb	V	Zn
1	13	2340	670	9900	10000	0.6	<1.0	3.5	16	0.1	155	8.5	39	21	53
2	14	2860	770	12250	12000	0.8	<1.0	5.0	23	0.2	190	16	47	25	63

QS-D/QR01 WINSOR DAM

SAMPLE NO.	%TVS	TKN	TP	Al	Fe	As	Cd	Cr	Cu	Hg	Mn	Ni	Pb	V	Zn
1	10.1	5450	1770	11650	13500	1.8	<1.0	3.0	14	0.2	700	9.5	36	25	50
2	12.7	3490	1200	11750	17000	2.2	<1.0	5.0	14	0.1	390	10	49	28	65

TABLE 22

QUABBIN RESERVOIR WATER QUALITY AND SEDIMENT DATA REPORT

SEDIMENT DATA (mg/kg dry weight)

OCTOBER 1989

STATIONS IN CENTRAL BASIN

QS-E/QR04 ENFIELD

SAMPLE NO.	%TVS	TKN	TP	Al	Fe	As	Cd	Cr	Cu	Hg	Mn	Ni	Pb	V	Zn
1	8.82	3150	1080	17600	27500	2.5	<1.0	6.5	26	0.4	850	11	105	45	110
2	11.4	2350	890	12000	17000	2.1	<1.0	5.0	17	0.2	400	11	55	30	85

QS-F PRESCOTT BROOK

SAMPLE NO.	%TVS	TKN	TP	Al	Fe	As	Cd	Cr	Cu	Hg	Mn	Ni	Pb	V	Zn
1	6.5	1400	730	16000	13000	0.7	<1.0	4.5	10	0.2	145	15	19	28	42

QS-G GREENWICH LAKE

SAMPLE NO.	%TVS	TKN	TP	Al	Fe	As	Cd	Cr	Cu	Hg	Mn	Ni	Pb	V	Zn
1	15.8	3450	1270	15500	33000	1.8	<1.0	4.0	16	0.1	435	12	55	39	73
2	10.2	3100	1130	13600	7000	<0.05	<1.0	<1.0	14	0.4	1650	12	60	2.5	78

QS-H/QR06 SHAFT 12 - QUABBIN LAKE

SAMPLE NO.	%TVS	TKN	TP	Al	Fe	As	Cd	Cr	Cu	Hg	Mn	Ni	Pb	V	Zn
1	6.09	1230	510	21250	25000	3.0	<1.0	7.0	47	0.1	550	18	135	65	150
2	6.64	1630	560	18500	41000	3.0	<1.0	5.0	26	<0.1	2300	13	120	50	135

QS-I/QR07 MID-BASIN

SAMPLE NO.	%TVS	TKN	TP	Al	Fe	As	Cd	Cr	Cu	Hg	Mn	Ni	Pb	V	Zn
1	3.9	850	600	8800	13500	0.9	<1.0	5.5	16	0.2	280	10	15	24	42
2	6.5	920	350	6050	6000	0.8	<1.0	1.5	4	0.1	380	3.5	18	11	34

TABLE 23

QUABBIN RESERVOIR WATER QUALITY AND SEDIMENT DATA REPORT

SEDIMENT DATA (mg/kg dry weight)

OCTOBER 1989

STATIONS IN EAST BASIN

QS-J/QR10 NEAR DEN HILL

SAMPLE LOCATION	TVS(%)	TKN	TP	Al	Fe	As	Cd	Cr	Cu	Hg	Mn	Ni	Pb	V	Zn
1	3.32	1410	1370	13050	21000	1.3	<1.0	7.0	22	0.2	600	18	55	41	83
2	5.33	3430	2250	22450	36000	2.2	<1.0	5.5	21	0.1	420	19	120	55	150
3	8.08	2130	1070	10940	18500	1.4	<1.0	2.5	8.5	0.2	350	8.5	31	24	42
4	5.80	3210	2340	21150	36500	2.8	<1.0	6.0	18	0.2	430	18	120	60	155

QS-K BOAT RENTAL AREA

SAMPLE LOCATION	TVS(%)	TKN	TP	Al	Fe	As	Cd	Cr	Cu	Hg	Mn	Ni	Pb	V	Zn
1	31.0	5960	1730	11300	23500	1.3	<1.0	3.5	17	0.6	370	11	75	36	83

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APPENDIX A

ANALYTICAL METHODS USED AT LAWRENCE EXPERIMENT STATION

<u>Parameter</u>	<u>Methods</u>	<u>Units</u>
Ag, As, Cd, Cr, Cu, Fe, Pb, Ni, Zn	EPA Manual Methods using Atomic Absorption graphite furnace analysis	mg/l
Hardness (Ca + Mg)	EPA Manual Methods using Atomic Absorption Spectroscopy, Flame A.A.	
Al	EPA Method 200.7: ICP Atomic Emissions Spectrometry	mg/l
Total Phosphorus	Sulfuric acid and ammonium peroxy- disulfate digestion. Ascorbic acid reduction. Manual spectrophotometric method using a 10 cm path length cell.	mg/l
Total Kjeldahl Nitrogen	Acid digestion using Technicon BD-40 Block Digester. Colori- metric analysis (reaction of ammonia, sodium salicylate, sodium nitroprusside, and sodium hypo- chlorite in buffered alkaline medium) using (Technicon) Traacs II auto analyzer.	mg/l
Ammonia Nitrogen	Phenate method, automated. Colorimetric analysis using (Technicon) Traacs II auto analyzer.	mg/l
Nitrate Nitrogen	Hydrazine reduction method, automated. Colorimetric analysis using (Technicon) Traacs II auto analyzer.	mg/l

APPENDIX B

ANALYTICAL METHODS USED AT MDC LABORATORIES

<u>Parameter</u>	<u>Standard Method</u>	<u>Units</u>
Alkalinity	SM403	mg/l
Bacteria		
Total Coliform	SM909A	Coliforms/100ml
Total Heterotrophic	SM907C	CFU/ml = (Colony Forming Units/ml)
Chloride	SM407B	mg/l
Chlorophyll	DWPC-SOP	mg/m3
Color	SM204A	Color Units
Phytoplankton	DWPC-SOP	ASU/ml
Solids		
Total	SM209A	mg/l
Fixed	SM209D	mg/l
Turbidity	SM 214A	NTU = (Nephelometric Turbidity Units)

SM=Standard Methods for the Examination of Water and Wastewater, 16th Edition, 1985.

DWPC SOP=Standard Operating Procedures, Biology Section. Division of Water Pollution Control. 1989.

APPENDIX C

BOTTLE PREPARATION

Water Column Metals

One liter glass bottles with teflon lined plastic caps were rinsed with a 1:1 solution of nitric acid, followed by three rinses with distilled/deionized water. The bottles were next washed with a 1:1 solution of hydrochloric acid followed by three rinses with distilled/deionized water. Bottles were then rinsed three times in the field with sample water.

Water Column Nutrients

One liter glass bottles with teflon lined plastic caps were rinsed with a 1:1 solution of hydrochloric acid followed by three rinses with distilled/deionized water. Bottles were then rinsed three times in the field with sample water.

Sediment Metals and Nutrients

One-half liter plastic tubs were rinsed with a 30% solution of hydrochloric acid followed by three rinses with distilled/deionized water.

APPENDIX D

PHYTOPLANKTON AND CHLOROPHYLL SAMPLING INFORMATION

STATION	DATE	SAMPLING DEPTHS			STATION		ADDITIONAL	
		0.5	13.7	27.4	DEPTH	PHYTO	SAMPLE	CHL _a
QR01	4/19/89	0.5	13.7	27.4	36.0	C	.	C
QR01	5/18/89	0.5	12.0	24.0	36.0	C		C
QR01	6/14/89	0.5	6.0	12.0	36.2	D		C
QR01	7/19/89	0.5	12.0	25.0	37.0	C		C
QR01	8/16/89	0.5	14.7	29.4	36.9	C	D 8.0 m	C
QR01	9/21/89	0.5	16.0	32.1	40.2	C		C
QR01	10/25/89	0.5	13.0	27.0	40.3	C		C
QR01	11/15/89	0.5	12.5	25.5	39.0	C		C
QR02	4/19/89	0.5	14.0	28.4	31.0	C		C
QR02	5/18/89	0.5	13.5	27.0	31.0	C		C
QR02	7/19/89	0.5	14.2	28.8	31.8	C		C
QR02	8/16/89	0.5	14.5	29.1	31.7	C		C
QR02	9/21/89	0.5	13.5	27.6	35.0	C	D 12.5 m	C
QR02	10/25/89	0.5	15.0	30.0	32.5	C		C
QR03	4/19/89	0.5	8.2	16.5	20.0	C		C
QR03	5/18/89	0.5	10.0	20.0	21.0	C		C
QR03	7/19/89	0.5	10.0	20.0	21.8	C		C
QR03	8/16/89	0.5	10.5	20.5	21.5	C		C
QR03	9/21/89	0.5	13.5	20.0	20.9	C		C
QR03	10/25/89	0.5	13.0	21.0	21.3	C		C
QR04	4/19/89	0.5	9.5	19.2	30.0	C		C
QR04	5/18/89	0.5	12.0	24.0	35.0	C		C
QR04	7/19/89	0.5	14.8	29.5	30.0	C		C
QR04	8/16/89	0.5	14.5	29.1	33.3	C		C
QR04	9/21/89	0.5	13.5	27.0	29.0	C		C
QR04	10/25/89	0.5	12.5	25.0	34.9	C		C

NOTE: C=Composite Sample. D=Discrete Sample. Depths expressed in meters.

APPENDIX D (CONTINUED)

STATION	DATE	SAMPLING DEPTHS			DEPTH	PHYTO	ADDITIONAL SAMPLE	CHL a
QR05	4/19/89	0.5	9.5	19.2	35.0	C		C
QR06	4/19/89	0.5	16.0	31.0	32.3	C		C
QR06	5/18/89	0.5	12.8	26.8	27.0	C		C
QR06	6/14/89	0.5	4.0	9.0	24.0	D		C
QR06	7/19/89	0.5	12.0	24.0	25.0	C		C
QR06	8/16/89	0.5	4.0	8.0	24.2	D	D 13.0 m	C
QR06	9/21/89	0.5	6.2	12.0	25.0	D		C
QR06	10/25/89	0.5	3.0	6.0	28.0	D		C
QR06	11/15/89	0.5	6.0	12.0	27.5	D		C
QR07	5/18/89	0.5	11.0	19.8	21.3	C		C
QR07	6/14/89	0.5	4.0	8.0	20.9	D		C
QR07	7/19/89	0.5	10.0	19.7	20.7	C		C
QR07	8/16/89	0.5	13.0	20.0	21.0	C		C
QR07	9/21/89	0.5	12.3	21.0	21.5	C		C
QR07	10/25/89	0.5	12.0	21.5	24.0	C		C
QR08	4/19/89	0.5	7.0	13.0	16.0	C		C
QR09	5/18/89	0.5	7.3	13.7	14.0	C		C
QR09	7/19/89	0.5	6.0	12.0	13.3	C		C
QR09	8/16/89	0.5	9.0	13.0	14.5	C		C
QR09	9/21/89	0.5	10.0	15.0	15.4	C		C
QR09	10/25/89	0.5	7.5	13.5	14.0	C		C
QR10	4/19/89	0.5	5.0	10.0	11.0	C		C
QR10	5/18/89	0.5	4.3	8.2	16.5	C		C
QR10	6/14/89	0.5			16.5	D		
QR10	7/19/89	0.5	7.0	14.0	15.8	C		C
QR10	8/16/89	0.5	7.0	14.0	16.0	C		C
QR10	9/21/89	0.5	6.9	13.8	16.2	C		C
QR10	10/25/89	0.5	6.0	17.5	18.0	C		C

NOTE: C=Composite Sample. D=Discrete Sample. Depths expressed in meters.

APPENDIX E

QUABBIN RESERVOIR ELEVATION AND RAINFALL DATA

DATE	ELEVATION (feet)	BELOW		PERCENT FULL	VOLUME	AVERAGE* RAINFALL (inches)
		CAPACITY (feet)				
3/19/89	511.7	18.3		69	285188	2.74
4/19/89	513.8	16.2		71	292808	4.08
5/18/89	516.4	13.6		75	310924	9.25
6/14/89	518.7	11.3		79	327283	6.09
7/19/89	518.6	11.4		79	326699	4.63
8/16/89	518.5	11.5		79	325531	6.56
9/21/89	518.1	12.9		78	322465	6.47
10/25/89	519.6	10.4		81	333415	7.45
11/15/89	520.5	9.5		83	340326	3.93
12/15/89	520.8	9.2		83	342472	1.52
1/15/90	520.5	9.5		83	340548	4.30
2/15/90	522.2	7.8		86	352725	4.70
3/15/90	523.9	6.1		89	366000	2.78
4/15/90	525.9	4.1		92	381150	4.13

NOTE: Volume is expressed in millions of gallons.

Capacity of reservoir is considered to be at 530 feet above Boston City Base.

*Average rainfall is the monthly average rainfall from the seven weather monitoring stations surrounding Quabbin Reservoir. These stations are located in North and South New Salem, Petersham, North Petersham, Pelham, Shaft 12, and at the MDC Administration Building in Belchertown.



